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Preserving and Dissemination of Digitised Sound Heritage in Contemporary Times: The Potential of Blockchain Technology

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Очување и дисеминација дигитизованог звучног наслеђа у савременом добу: потенцијал *блокчејн* технологије

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Abstract

Following recent technological changes, the archival profession will reach the moment of surpassing previously dominant mediaspheres, in which sounds and images were stored in traditionally located archives. This is not to say that traditional archives are not needed anymore – on the contrary. In this article, I will try to bring out the possibilities of upgrading traditional archives with the help of blockchain technology and to analyse the complex navigation between online market and commodification in the world of contemporary ethnomusicological contribution to sound heritage archiving.

Keywords: blockchain, archives, digitising, sound heritage.

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Апстракт

Судећи по технолошким променама до којих је дошло у скорије време, може се рећи да ће професије које укључују послове архивирања превазићи претходно доминантне медијасфере у којима су звуци и слике били чувани у традиционално организованим архивама. Ово не значи да традиционалне архиве више неће бити потребне – напротив. У овом тексту ћу покушати да мапирам могућности унапређивања традиционалних архива путем употребе *блокчејн* технологије, као и да анализирам комплексан низ проблема везаних за онлајн тржиште и комодификацију у свету савремених етномузиколошких доприноса архивирању звучног наслеђа.

Кључне речи: *блокчејн*, архиве, дигитизација, звучно наслеђе.

Digitised sound heritage and digital tools in the node of their complexity

Digitisation stands for translating the analogue audio format into an electronic one, but that explanation does not reveal its true complexity. If we have in mind that digitisation is an outcome of technological translations, then its objects are always already [technologically] emergent, and neither fixed nor finite (Cameron 2020, 58). In other words, although a product of technological manipulation, a digitised artefact is more similar to dynamic and semantic process than to a mere product, and its value lies in its cultural and contextual potential (Suvajdžić et al. 2022, 272). That is precisely why sound heritage digitisation should not be done only as a technological or a mechanical task. Instead, due to its complexity, sound digitisation should be done as an act of an informed decision which is rooted in digital humanity knowledge (Corrado and Sandy 2017, 106).

Before I discuss new technologies and their role in preserving and disseminating digitised sound heritage, it is important to shed some light on the notions of *digital*. What is, exactly, meant by *digital* in both literature and practical life, and is it really a part of our everyday reality to an extent that we can already consider it mainstream?

Speaking of the use of digital tools in GLAM institutions,[2] Lewi, Smith, Cooke and Vom Lehn argued that in recent years GLAM professions came to a point where their work cannot be imagined without digital technologies (Lewi et al. 2020, 2). Nevertheless, Lewi et al. conclude that it still cannot be claimed that digitality has become a method and language that is spoken fluently (Ibid.).[3] When compared to digital literacy, which is characterised by "technical and cognitive skills required to

2 GLAM, as an abbreviation, stands for the institutions that collect, preserve, manage and exhibit material and immaterial heritage artefacts – galleries, libraries, archives and museums.

3 Similarly, Rodley points to the fact that digital literacy, which might be a standard skill needed for preserving and disseminating cultural heritage in the 21st century, is still not the same as digital fluency, which is a communicational mode that we are yet to master (Rodley 2020: 88).

find, understand, evaluate, create, and communicate digital information in a wide variety of formats" (Rodley 2020, 88), digital fluency would require a specific confidence and developed field of knowledge, which is crucial to a process of heritage communication in contemporary, fast-paced and networked world, its audiences, and its consumers. Using digital tools at the level of fluency would bring a profound transformation and a metacognitive shift to GLAM professions and archiving processes. Therefore, digital tools should neither be othered and considered an enemy, nor praised and fetishised, although both of these radical positions can often be seen in the GLAM sector (Winesmith 2020, 45). Digital tools should provide professionals with the opportunity to transform the archives into visible, accessible, searchable and interactive databases, reframing the ways of contemplating how we meet, understand, appreciate, and use cultural artefacts of the past.

When speaking about digital archives that work with heritage artefact management, we should not restrict ourselves to professional conversations about technology and its usage or efficiency in itself. We should strive to encourage topics and dialogues that foster the field of digital humanities and then speak about technology from there. It is important, therefore, to mobilise knowledge from the humanities that is already present and to make a transdisciplinary leap, so that we can find a way to integrate technology and use it for a better and more comprehensive approach in humanities. This might be essential for matters of research, activities and actions that involve cultural heritage, and for understanding the place of the past in the present time. Following such an approach, before I present the achievements of blockchain technology and discuss how it can be used in digitised sound heritage archiving, in the next few chapters I will concentrate on some issues of the context in which we find sound heritage as intangible heritage today. This might be important for a deeper understanding of how blockchain technology can be useful, but also challenging in the processes of preserving and disseminating digitised sound heritage.

Digitised sound heritage and the question of materiality in digital times

Information can be considered the main unit of materialisation in digital/virtual space. As McConaghy, McMullen, Parry and Holtzman note, it is the flow of information that gives items, individuals and organisations visibility in a digital culture environment (McConaghy et al. 2017, 461). As it follows, digital space relies on immateriality that becomes translated to a new kind of materiality – informational materiality, given through writings, images, sounds and hyperlinked multimedia combinations.[4] What can archives, and, specifically, sound archives do about that, and how are they related to this state of the art?

4 "Digital objects appear to human users as colourful and visible beings. At the level of programming they are text files; furher down the operating system they are binary codes; finally, at the level of circuit boundaries they are nothing but signals generated by the values of voltage and the operation of logic gates" (Hui 2012, 387).

The process of digitisation transforms material, or an analogue item, into a digital one, thus dematerialising its medium and rematerialising it at the same time. Or, more precisely, it is the process of putting the dematerialised digital item/artefact into a network-like context or a *flow* that will rematerialise it in the realm of the Web, or webs.[5] This process of making the *material*/analogue *into information* rematerialises the item or an artefact, making it material enough for the digital realm. However, this process does not come without further questions and issues. For example, there is still, in a way, a habit or an often-seen attitude that predominantly marks digital materiality as *less material*. Speaking of sound archives, they are specific, since they do not start with the actual, found artefact itself, but with a recording. Sound archives, thus, do not collect *actual* field experiences, such as singing *per se*; they already collect technological substitutes – recordings that come *instead* of the field experience. In other words, in sound heritage archives, the line that divides material and non-material, or the experiential and technological is already blurred (Cameron 2020, 56). Moreover, the sound digitising process enhances the issue of the artificiality of sound heritage recordings because, unlike material archives, where the field-found item is present together with its marked value – its *aura* (Benjamin 1968, 216), sound archives *start* with the abstract, virtual, technological copy of the material experience at the field, while being, on the other hand, a *living* memory of the humanity (Mkadmi 2021, 58). Hereby, sound archives *need* technology, they cannot function without technology, and that marks technology-related topics, together with digital humanities, as topics of special importance in ethnomusicological discourses. Namely, of all the different types of archives, sound or video archives might be the best candidates for technological transformation and usage of the very new technologies for digitising and networking the digitised artefacts. This means that the question of technology application in digitised sound heritage should figure as one of the top priority issues for ethnomusicologists, but also for information technology professionals and programmers, who should work together in transdisciplinary teams. As Mkadmi says, "audiovisual documents are (…) technological media whose contents can only be read and consulted using technology. (…) As a result, audiovisual archives today represent an essential and rapidly evolving part of the digital world" (Mkadmi 2021, 59). Nevertheless, it should not be forgotten that digital archives are not related only to technology, but also to specific and numerous discursive practices, which makes them part of both humanist and technological professional discussions (Garcia 2017, 11).

The issue of digitisation is tightly connected to the possibilities of dissemination of the digitised units, as well as the questions of (mis)using disseminated material, which can become a point of concern to professionals working in digital archives. Sound archives are not an exception. In order for the sound archives to function efficiently and to retain their roles to some extent, digital sound heritage archive professionals think both about digitisation *and* about digital dissemination management,

5 Here Web refers to the Internet, and webs to the other kinds of networks – private, local or institutional, which are not necessarily connected to the Internet flow.

as the risk of misuse and abuse of easily accessible artefacts might be significant. On the one hand, the digital, informational kind of materiality provides visibility, accessibility, and manageability of data, which is all essential to processes of preservation, revitalisation, and usability of sound files in the case of sound archives, and it is surely an aspect that can bring benefits in contemporary times. On the other hand, the possibility of them being copied, altered, and used in different inconsiderate ways can pose a real threat to digitised sound heritage. All these perspectives and problems will be discussed in the next chapters, using blockchain technology as an example and a possible solution for the aforementioned issues. In order for such a discussion to be clear, there is yet another topic that should be mentioned: the audience – users, or contemporary digital-goods consumers.

User-oriented archives and content: whose journey is it?

A network might be a network, but in any case, it is approached from the specific entry points. Or, the other way round, a network might be a multidimensional communication of informational points and nodes, but it still has its exit points that actually form another network and give back to the whole networking structure. These entry and exit points are embodied in the subjects of *users*. Seen as consumers, information collectors, researchers, or hobbyists, the users are (providing the Web 2.0 conditions) also content managers and content creators. Thus said, users do not represent passive entry/exit network ends – they are active, (re)producing nodes, and what is produced, of course, is information. The information management that comes from the users imbues the information with the idea of relevance and meaning; it creates a sense of individual or shared identities, and it shapes and reshapes notions of history and presence, as well as micro or macro communities. In that way, it is important that there is a discussion about the challenges of digital times, and of the possible technological solutions to the (fore)seen problems. As much as we may see sound heritage digitisation as a journey of the professionals, it is as well a part of the digital journey of present and future archive content users.

The web 2.0 system and the entire digitisation movement has brought about discussions of the democratisation of knowledge, heritage and art. A significant number of topics also involve user-related direction of Web material, be it social media or an archive. These days, users are conceived as autonomous human actors within a global infosphere (Cameron 2020, 55), and they want to interact with their digital environment. As much as traditional archives might have been memorialising, conservative, limited, and suggestive of a linear history, the new, Web-placed archives are contemporary collections that work with problem-solving engines, and that are branching, generative, and non-teleological (Nowviskie 2020, 93). Nancy Proctor is comparing these archives to *distributed networks* (Proctor 2020), which is, interestingly enough, exactly the type of a system through which blockchain operates. Again, making a wise choice towards technology systems and application programming interfaces can help both professionals and users to make heritage digital archives relevant and interesting in a respectful manner.

Digital space is quite an unpredictable field; not all users will treat the material that they might find in the same way. As for a large number of digital sound heritage archives, the majority of users will still be academics and independent researchers. Some of the users might also be artists, who look for inspiration for their work, but a great part of the audience might belong to a miscellaneous group of culture-snackers that search for ways of connecting with traditional culture in their life (Winesmith 2020, 48); or they could be just passers-by who will search for the opportunity to share some content through the social networks that they use. Some of the users might try to download the material and alter it. Some of them might try to copy it or (re-)sell it. As Andrew Dewdney notes, the main change to the digitisation project of online collections has been brought by search engines and sharing platforms (Dewdney 2020, 74), and that means that we may never know what happened to our material once we put it on the Web. This can create lots of challenges and problems with copyright and ownership issues, as well as with constant danger of misusing and abusing digitised heritage artefacts. Should the archive content, then, be controlled, and how should it be done?[6] What should be done with all the ethical and practical questions? Is there a way to protect the posted artefact, together with the possibility of tracking its usage thoroughly throughout the Web, and if yes, will it reduce the popularity or visibility of the archive? How can it be ensured that the artefacts are being used in a respectful manner? In the other words, is there an engine to help professionals do both preservation, revitalisation, and dissemination of the digitised sound heritage? Blockchain technology might be one of the good solutions, although it also opens a lot of contradictory questions and conclusions.

Blockchain technology: a Janus-faced solution

Within the world of art and humanities, blockchain technology is often considered a Janus-faced solution (Jones and Skinner 2017, 9). Blockchain technology was primarily made for the financial and economic challenges of the present times, which means that it is dutifully oriented towards transparency, efficiency, technology, monetisation of digital units, payments, and (crypto)capitalist logic. On one hand, it can be regarded as one of the most secure digital systems of transactions which is highly praised as a radical ethical solution, and on the other hand, it has been criticised as a strictly capitalistic, reductionist tool of technological determinism (Jones and Skinner 2017, 17; Zeilinger 2017, 288). Or, if the Web might be defined as the Internet of information and communication, blockchain can be regarded as the Internet of money (Catlow 2019, 27).

6 For a sharp critique of the idea(l) of unconditional openness of online archives see Sherrat 2020. On the other hand, as Sherrat also points out, some benefits of open archives might be quite important: there are people who would find the archive, and who would never normally come to an archive as a building; artifacts can be downloadable, which, if controlled, can be of quite a help to researchers; researchers can choose their path of discovery, and, if the archive is interactive, they can ask questions on the spot (Sherrat 2020, 116).

What is, exactly, a blockchain system? It can be presented as numbers of distributed ledgers, or documentary frameworks that record all the transactions included in the chain. Here "transactions" can mean financial transactions, but also any action of transferring a digital unit of any kind. Although first made for cryptocurrency transactions,[7] because of its capabilities to ensure a safe environment for buying, selling, lending, or exchange, it has found its usage as a tool in social sciences and art (Suvajdzic et al. 2019, 2022). What the blockchain system does is eliminate third parties, so the one who is offering a digital unit can safely trade with the one(s) who are buying it or taking it, without further costs or time spent (Chalaemwongwan and Kurutach 2018, 957). There are no taxes, no providers, and no centralisation. It is, thus, a decentralised system of communication, and a kind of an archive in which all the records of what has happened between the parties are written, locked into the block, and made immutable through hash – a cryptographic suture that "sews" one block to another and so on. All the records have been timestamped and transferred from a block to a block, so there is virtually no way of altering the information that any of the blocks contain. Instead of third-party proof of trust, the blockchain system offers a cryptographic guarantee of precision, so it could be *trustless*: both because it is independent of a trusted source (other than blockchain), and because it is regarded as proof that nothing can be trusted enough (the verifiers are multiplied) (Magnhildøen 2017, 313). Although blockchain is a highly technological system, there are no fewer mediators to the transaction, but more. Instead of one or a couple of mediators, here all the participants in the blockchain system, as specific informational nodes, are witnesses to the transaction. Every new recording made is reflected in all the nodes and verified by them automatically, so it cannot happen that someone just forges or falsifies any information stored in the blockchain. This makes the blockchain pretty much of a unique system that a) works with digital units, b) enables a communicational track that eliminates forging and/or stealing, and c) enlarges a body of verifiers to the process, with less cost and more efficiency. The longer the blockchain, the safer it is, which in itself produces a system whose strength is amplified with more digital units, transactions, and participants involved, and not vice versa (Myers 2017, 247). Thus, blockchain technology can be regarded as one of the more revolutionary technological tools for the future (Mkadmi 2021, 137), and it can be used in a very wide range of professional and practical fields,[8] including digital heritage preservation and dissemination.

7 Basic concepts of the blockchain system reach back to Satoshi Nakamoto's 2008 whitepaper "Bitcoin: A Peer-to-Peer Electronic Cash System" (Nakamoto 2008). Blockchain itself is developed exactly for the cryptocurrency market, although its usage is possible and yet to be explored in other professions and fields.

8 The examples of blockchain-based archives in the fields of art would be the Ascribe platform, Monegraph, BAE – Blockchain Art Exchange, BigchainDB and many more, which can all be found online under the same names.

What can blockchain bring to digital archives?

As digital sound heritage archives work with digitised recordings, which are nothing else than digital units that should be accessible, visible, but also protected, blockchain technology might be an interesting and useful solution. One of the biggest problems until blockchain technology emerged was that the digital units, if not protected adequately, could easily be copied, shared, or altered without permission, and it might have been discovered late, or it might not be discovered at all. With the blockchain system, it can never happen – blockchain automatically records all the changes and writes them into the blocks, so any type of file handling is quite easily tracked and monitored. Blockchain system, actually, transforms digital goods into commodities, or tangible goods that can be treated with all their integrity within a virtual/electronic environment and online world. What blockchain does here can precisely recall the idea of rematerialisation of the digital; with the blockchain, digitised recordings are not regarded as simple copies of analogue recordings anymore, or as a mere copy of the traditional archive, but as material, detectable value in itself.

Blockchain systems can also reduce human resources investment. Unlike traditional archives, where a person – a professional is usually present and in charge of the task of working with digitised units, with the blockchain the system itself – the technology – is doing basic work of tracking what is happening with the digitised files, who is approaching them, who is using which kind of approved action (listening online, downloading, borrowing, buying, sharing, or altering them for other purposes) and so on. With the emergence of a new generation of blockchain crypto-communication, there is even an option not to have a human agent present in the online archive at all – whatever is done with digitised files can be done through smart contracts, where the technology itself will make a contract with an interested party and regulate the process.[9] This kind of intervention eliminates human agency from the process – if that is what is desired for matters of efficiency or qualitative improvement of working conditions, and it still enables a safe and controlled transaction. Moreover, it affords a "contradictory possibility of ubiquity and scarcity at the same time" (Sacks et al. 2015, 16), which can prove beneficial for digital sound heritage archives. Becoming scarce units on their own, digitised sound recordings would be fully protected, but it would not affect their accessibility and visibility in the online world. This could help in promoting and disseminating digitised sound heritage in a safe and predicted way.

There is also an issue with the ease of copying and illegal sharing of a digital unit. A special problem with digital, or digitised units is their relation to copying and theft. If we look at the material object cases, to take a material object illegally

9 The concept of a smart contract was first mentioned and explained by Nick Szabo, a computer scientist in 1993, but it has become available since Ethereum cryptogeneration (Zeilinger 2016, 16; Seidler et al. 2017, 67). Smart contracts are pre-defined contracts that can be set so that the blockchain system automatically applies it when the user initiates the desired action. In this way, the terms of an agreement between buyer and seller are directly written into the chain code, so they automatically function as binding.

is clearly considered theft. Once taken illegally, the object is simply not there with the first owner anymore. If the digital object is at stake, taking it illegally might just mean copying it perfectly, so the copy is literally the same as the original. It can also happen that the file is shared without the consent of the owner, but it still does not take the object from the owner – the owner still has it. In the other words, things are a bit more complicated with digital objects of value. Speaking about digital art, McConaghy et al. refer to this problem of copying as to "an elephant of the room in digital art" (McConaghy et al. 2017, 469). It could be a rather similar situation with digitised sound heritage: if we opt for using a less specific and sensitive protective technology, it may happen that the artefact gets illegally taken or used, and that it cannot be easily caught or tracked, because one exact piece of digital recording is still there, in the archive, untaken. This can create problems with ownership issues, in cases where recordings or field findings are protected and should not be shared without consent or regulations. Because of its excellent tracking capabilities in the online sphere, blockchain system solves this issue and enables the owners/archive managers to track the file and find it, together with the person who originally took it and misused it. This is entirely possible because of the double keys that every blockchain user has and uses – a public key, which is visible to all and through which everything related to the transaction can be tracked, and a private key, which is keeping the anonymity of users, in case where transactions are done in an expected manner. In the world of art, there are currently a couple of platforms designed to have these protective functions, like Monegraph, Ascribe, BigchainDB, and many more. Some of these platforms could be also open, designed, or developed for digital sound archives in the near future. That could bring a possibility for the sound heritage to be popularised, opened to new audiences and new usages, but also protected and preserved in a professional way. Speaking, again, about the world of art, which might be highly applicable to the world of digitised sound archives, David Serra-Navarro (2019, 971) points out possible future benefits for the professions and industries that work with digital or/and digitised objects of value. As Serra-Navarro says, some of the benefits might be in the new funding models that can emerge; besides that, the blockchain system, with its automated programs, would lower the costs of organising and managing the collection, and it would bring new kinds of audiences, patrons and participants. Most of all, blockchain systems could bring unanticipated futures for the professional fields that are still not using it (Serra-Navarro 2019, 973). But is it all good news?

Blockchain and digitised sound heritage: more questions than answers

As much as it was written about the possible benefits of the blockchain system to digital units, artefacts and archives, including digital sound archives, practically the same number of arguments are given to the contrary. That means, first of all, that blockchain technology is still new and insufficiently explored in different function-

al areas, and its capacities and possibilities are still to be checked. Also, in order to successfully apply blockchain technology in the fields of heritage archiving or performance/art, professionals will have to mobilise and renew their knowledge from humanities-related disciplines they are coming from. Once again, to use technology for the matters of culture or heritage without engaging the platform of digital humanities would be just irresponsible, or, at best, ignorant. That is why humanities, and in this case digital humanities, are extremely important in the intensely technological world to come.

One of the most prominent types of negative arguments towards blockchain usage in humanities are revolving around the idea of the ultimate financialisation and commodification of cultural artefacts (Zeilinger 2016, 1; Zeilinger 2019, 288; O'Dwyer 2019, 305). As a blockchain system is made for financial assets, it implies financial value to the object in question. Blockchain is developed to protect this value, and it works for safe transactions under desired conditions. Can cultural, and, specifically, traditional artefacts, after all, be discussed in such terms? On the other hand, would it be wrong if it could? And is then every attempt to define the value of a digitised sound heritage artefact impossible? But, if the artefact is not openly defined as an artefact of value and put in the system as such, how can we legally solve the issues of theft, copying, illegal sharing and misuse? Are heritage archives already a part of the wider market, and if yes, have we properly addressed it? Certainly, blockchain technology leaves us with more questions than answers at this point, but it brings us back to the very basic questions of humanities, and consequently digital humanities. One of them would be defining the type of worth of the cultural artefact in contemporary times, which is not an easy topic at all.

One group of authors points to the question of freedom within the digital sphere, at least when cultural artefacts are at stake (Zeilinger 2016, 1; O'Dwyer 2018, 305; Myers 2020, 239; Sherratt 2020, 116; Caswell and Cifor 2020, 159). *Should* we make cultural artefacts fit to a monitored market? Following this dilemma, O'Dwyer (2018, 15) even asks if this idea of freedom is necessarily antithetical to profit – in the other words, if we open an artefact, a collection, or an archive to be freely accessed and used, does it mean also that the artefacts have to be, or should be for free?

Another statement goes towards the still present lack of understanding of the culture/art heritage market from inside the blockchain technological ecosystem. As Fernandez et al say, the tech industry assumes that technology needs to help humanities and art to protect the digital artefacts, thus "solving the issue" once for good (Fernandez et al 2019, 3; Zeilinger 2017, 3), wherein humanities and art might actually need a completely different kind of help, or tools. This could be improved by encouraging more inter- and transdisciplinary dialogues, meetings, conferences, and working teams. There is also a worry that in case of such a strong dependence on technology, the society might be taken over by a small group of technocrats, and that it would severely influence the current state of academy, humanities, and research, but also the state of other related professions.

Last but not least, some of the voices of concern go to the notion of energy consumption. Cryptographic mining, which is necessary for producing hashes and locking the blocks one into another, requires a substantial source of energy. This kind

of production still cannot be done without heavy machines that consume so much electricity that it may actually contribute to global warming (Nadal and Andaluz 2019, 73). Of course, in recent years, there have been numerous discussions on this topic and some solutions have already been found. Still, it may take some time for this issue to be resolved.

The role of blockchain technology in preserving and disseminating digitised sound heritage may still leave us with a huge number of questions and a significant unease. What is important is that these questions have to be asked, from the point of digital humanities no less. All these disciplines – including ethnomusicology – rely on digital tools more and more, and the only way to actively *make* these tools work for our needs and ideas is to grapple with them and to engage in dialogues with all the other professionals that deal with similar issues and circumstances. As for the blockchain and digitised sound heritage archives, it may be worth a try. If nothing else, as professionals, we may discover how we see the heritage that we work with, what its role in the present times is, and what it is that we need from technology in order to retain or revitalise its value.

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Драгана Стојановић

Очување и дисеминација дигитизованог звучног наслеђа у савременом добу: потенцијал *блокчејн* технологије

(Резиме)

Овај рад фокусиран је на истраживање потенцијала *блокчејн* технологије, као и на њен допринос очувању и дисеминацији већ дигитизованих артефаката наслеђа сачуваних у звучној и видео форми. Пратећи важне аспекте како технолошких, тако и етномузиколошких проблема, који произлазе из ове теме, текст је организован у шест мањих потпоглавља која покривају питања комплексности дефинисања дигитизације звучног наслеђа и етику примене *блокчејн* технологије на звучне архиве. Рад се бави кључним појмовима као што су дигитална флуентност и дигитална хуманистика, те покреће питање материјалности у дигиталном добу, при чему је приметно суштинско повећање потребе за извесном „материјализацијом", односно за фиксирањем дигиталног формата у опипљиво културно добро које је могуће сачувати. У тексту се такође испитује концепт архива окренутог корисницима и анализира однос корисника и садржаја у временима мултидирекционе онлајн комуникације. Напослетку, рад представља *блокчејн* технологију у светлу ефективног система организовања дељених дигитизованих звучних архива, испитујући дату технологију путем савремених етичких питања као што су комодификација, власништво, улагање у људске ресурсе, трошење енергије и интер/трансдисциплинарна сарадња.