

A New Ecosystem of Early Music Studies

COST ACTION CA21161

Endangered Musical Sources: Strategies for Safeguarding, Digitization, and International Collaboration.

REPORT OF WORKING GROUP 2 SOURCES, WROCŁAW, 22-24 MAY 2024

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Introduction

One of the primary goals of the WG2 SOURCES working group within EarlyMuse is to emphasize the value of Europe's musical heritage. This involves not only maintaining, preserving, and safeguarding sources (which is essential), but also encouraging academic, artistic, and educational communities to engage in continuous hermeneutic actions. Despite the availability of new technologies and their use in daily work, unforeseen and crisis situations still arise, requiring various procedures and so-called "emergency solutions". We are convinced that preserving musical sources will allow us to retain the centuries-old cultural heritage and memory of our past, which shapes European identity. Consequently, this becomes a priority guide in charting new horizons.

In light of the principles expressed in the *Memorandum of Understanding*, our efforts have thus far focused on identifying endangered collections and corpora of early music, as well as



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criteria for cataloging musical works. A key factor supporting these actions is the close collaboration with the main RISM editorial offices in Frankfurt am Main and the RISM Digital Center in Bern. During workshops in Lisbon and Wrocław, we dedicated much attention to the methods of processing musical sources, making them accessible, and, most importantly, identifying source collections that urgently require conservation support and digitization.

Therefore, at the workshop in Wrocław, which took place from May 22-24, 2024, at the Institute of Musicology, University of Wrocław, WG2 members focused their discussions on:

- Describing methods for identifying and cataloging endangered musical sources (including those in Ukraine),
- Establishing a protocol for information exchange with RISM.

To effectively prepare for the specificity of the upcoming WG2 community workshops (over 140 participants), a preliminary online meeting was held in February 2024, which also aimed to gather data from two surveys. These surveys provided insight into the areas in which WG2 members (musicologists, music theorists, performers, librarians and archivists, educators, cultural managers) work with early music sources, their expectations regarding cooperation with the IT sector, and the direction we aim to take in the project and for the Wrocław workshops.

The invitation to participate in the Wrocław meeting was extended through the "Call for Contributions to the Meeting in Wrocław" and the February 2024 online meeting. Ultimately, 15 people were selected, with 13 problem areas presented on-site.

These were divided into four thematic areas:

- I. Information Exchange with RISM
- II. Identification and Cataloging of Endangered Musical Sources
- III. Regulations for the Protection and Access to Musical Sources
- IV. Technological Challenges in the Preservation and Access to Musical Sources.

The discussions were attended by members of WG2, as well as invited guests, including:

Balázs Mikusi - Executive Director of RISM, Zentralredaktion in Frankfurt am Main

Sonia Rzepka - University of Warsaw, Member of the RISM Coordinating Committee

Steffen Voss - Bayerische Staatsbibliothek, Member of the RISM Coordinating Committee

Magdalena Wiącek - Karol Lipiński Academy of Music in Wrocław, President of IAML Polish Branch

Rodolfo Zitellini - Scientific Collaborator of RISM Digital Center in Bern

I. Exchange of information with RISM

Contribution by Emilio Ros-Fábregas (IMF-CSIC, Barcelona)



The platform »Books of Hispanic Polyphony IMF-CSIC« as a European case study in the Cost Action 'EarlyMuse': perspectives on collaboration with RISM and other digital projects

Books of Hispanic Polyphony IMF-CSIC (BHP) is an open access digital platform to serve as a comprehensive research tool concerning manuscript and printed polyphonic books in Spain and books with Hispanic polyphony elsewhere.

He said that when he started working on this project, he didn't have any idea how many manuscripts are there. That's when he came with idea of the catalog.

As a result, he proposed several solutions:

• Functionalities and capabilities of the BHP database:

- o BHP offers catalog search using tags, such as "woman connected sources"
- Through documentation found in the cathedral, he attributed some works to the composer Juan Navarro
- Technology and features of the BHP database:
 - The BHP database includes full compositions (not just incipits like in RISM) thanks to MEI technology and Optical Music Recognition (OMR)
 - The incipits in BHP contain musical intervals, which according to the speaker, facilitate research
 - It is possible to add the record's author (a researcher's perspective, rather than a "librarian's mission"), which sets it apart from RISM

• Liturgical research on polyphony:

• BHP allows research using voices from liturgical books of various feasts.

The author also emphasized **the desire to strengthen cooperation with RISM** in order to integrate the functionalities of both databases. The following Relationship Graph between the BHP and RISM databases (Graph 1) illustrates the collaboration and connections between the two databases, including key functionalities (e.g., MEI, OMR, full compositions) and shared research areas.

Conclusions:

- The BHP database is a multifunctional tool that expands research possibilities, especially in the context of polyphony and musical sources.
- The willingness to collaborate between BHP and RISM demonstrates how both databases can complement each other, particularly in the areas of music technology and archiving.
- BHP offers more advanced features (e.g., full compositions, intervals in incipits) that enhance musicological research compared to RISM.



Collaboration Network Between BHP and RISM



Contribution by Sonia Rzepka (University of Warsaw)

Music Inventory Cataloguing in RISM Database - benefits and challenges

The topic addressed by the Author concerned the cataloging of music collections, with an emphasis on cataloging inventories and their inclusion in the RISM database. The main challenges discussed were: 1) Cataloging musical inventories in the RISM database, and 2) Issues related to access and information retrieval. The Author highlighted existing initiatives and research in these areas, citing the "Historical Music Inventories 1500-1800" database (University of Freiburg) as an example, along with research conducted by Czech and Slovak scholars presented at the IAML Congress in 2022. The goal of the Author's presentation was to showcase the benefits of integrating inventory data into the RISM database, while also discussing the challenges from both the cataloger's and user's perspectives.

In discussing the benefits of integrating inventory data into RISM, the Author highlighted the following areas:

- Enhanced historical documentation,
- Facilitation of both micro- and macro-historical research,
- Tracking changes in music collections over time.

However, there are **challenges for catalogers** associated with this:

- Defining consistent cataloging standards,
- Gaps and inaccuracies in inventories, which can lead to incomplete or erroneous data,
- The labor-intensive nature of the work.

As the RISM catalogue has so far only documented existing sources and has not recorded lost sources or those known only from indirect sources, one of the **challenges for users** may



be the correct interpretation of the inventory data catalogued in the RISM database. Several areas requiring further discussion, which were raised during the meeting in Wrocław, include:

- From which periods should inventories be cataloged?

- Should printed inventories be included in the RISM database?
- How to classify inventories that do not contain musical incipits?
- How to distinguish inventories from the individual items they list?
- To what extent can the cataloguing schemes used to now be applied?
- How to indicate the relationships between sources in inventories and manuscripts or prints?
- How to describe lost sources in RISM?

Conclusions:

- **There is a clear need to develop consistent cataloging rules** for both existing and lost sources to better understand music history and its documentation.
- Current research highlights the growing importance of inventories as a research source. Inventories can provide valuable information about collections that may be difficult to trace in other resources (e.g., the development of provenance studies).
- **There are noticeable challenges related to data inaccuracies**. Additional verification procedures need to be introduced in the cataloging process.
- The use of consistent terminology in defining relationships between sources and inventories is essential. It is important to clearly define the connections between the sources described in inventories and the physical manuscripts or prints.

To visualize and summarize these conclusions, the relationship graph below illustrates the dependencies between **sources, inventories, and the key challenges** faced by both catalogers and users, as well as the issues related to data inaccuracies, lost sources, and the need for verification and standards (Graph 2).





Relationships Between Sources, Inventories, and Challenges in RISM

Contribution by **Agnese Pavanello** (Fachhochschule Nordwestschweiz / Musik-Akademie Basel)

Integrating Data from Giuseppe Tartini's Online Catalogue

The author addressed the issue of RISM's strategy concerning the integration of data with Muscat, a software developed by RISM for cataloguers of musical sources into the RISM database. **The main assumptions** presented by the author are as follows:

- RISM is developing strategies for integrating existing data into the Muscat system.
- A challenge lies in integrating data from thematic catalogs (e.g., Giuseppe Tartini's catalog), which are based on different systems, such as MerMEID (used in Tartini's catalog).
- Tartini's catalog, although organized in MerMEID, contains data not yet present in RISM.

The author raised the following key questions:

- What are the prospects for integrating data between MerMEID and Muscat?
- Can Muscat and MerMEID be connected?
- Can the visualization of data, which allows for grouping of matches and other organizational functions useful in research, be maintained?
- How can Tartini's catalog enrich RISM and improve its functionality?

The author explained that **MerMEID** is open-source software for **editing and creating MEI files**. In the mentioned Tartini catalog, MerMEID is used, offering features not yet available in RISM. The MEI format is gradually becoming more common and universal in the field of processing musical sources. The author proposed **integrating MerMEID with RISM-Muscat** to enhance RISM's catalog and its operations. However, this entails several challenges, which were discussed by contributors such as Rebekah Ahrendt, Patryk Frankowski, Grzegorz Joachimiak, Balázs Mikusi, Agnesse Pavanello, Emilio Ros-Fábregas, Steffen Voss, and Rodolfo Zitellini. The discussion covered issues such as:

- Data problems: There is a risk of duplicates when integrating databases.



- **Young researchers**: Presenters highlighted that young researchers want their names linked to records, which holds academic significance and often drives their involvement in musical source cataloging initiatives.
- **Muscat functionalities**: The discussion centered on what is needed for RISM to better support musical projects. Key issues include metadata, interoperability, and the ability to select parameters (e.g., instrumentation).
- **Metadata standardization**: RISM is valued for collecting standardized data, but the introduction of new metadata must be carefully considered to avoid excessive workload.
- **Support for RISM**: The crucial role of musicologists in supporting RISM by introducing new data was emphasized, especially since not all institutions employ music librarians.

A mind map could help summarize these issues, showing the key questions and challenges concerning the integration of RISM and MerMEID, with reference to crucial topics such as metadata standardization and the role of young researchers (Figure 3).



Mind Map: Key Questions and Challenges in RISM-MerMEID Integration

Conclusions:

- **Need for integration**: There is a need for better integration of the Muscat, MerMEID system and other databases or catalogues, which could enrich RISM by adding new features and sources.
- **Data management**: The introduction of tools for managing metadata, such as options for selecting instrumentation, could improve RISM's database functionality.
- **Role of young researchers**: There is pressure to allow young scholars to link their names to database records, which could motivate further development of the project.



Among the presented issues, two addressed the integration of data from newly established databases with RISM, while the third expressed several suggestions indicating areas for further expanding RISM's resources. This not only highlights the immense significance of RISM for cultural heritage but also shows the clear engagement of various communities and the desire to collaboratively develop it to meet the needs arising from individual research tasks.

II. Identification and description of endangered music sources

Contribution by Ferran Escrivà-Llorca (Universitat de València)

Endangered Musical Sources in Valencia (Spain)

The author highlighted the ongoing process of digitization, which is saving musical sources from physical deterioration while simultaneously increasing accessibility for the scholarly community. He referred to **the state of research** in the 1970s and 1980s, when documentary studies were conducted in key religious institutions of Valencia, such as the Valencia Cathedral, and catalogs were published. The large choral books in the cathedral are in good condition, and some have been restored, as have liturgical books. However, several unresolved issues remain, particularly concerning 17th-century musical sources. Some scores (e.g., the villancicos by Juan Bautista Comes) are at risk due to the poor quality of the paper and the high iron content in the ink, and access to them and other resources is limited. Furthermore, it is not allowed to take personal photographs of the documents. Contributing to this are insufficient institutional support for musicology in Valencia, the lack of top-down regulation at the national or EU level, and the challenges associated with safeguarding musical heritage, particularly in private and religious archives. All of this raises serious concerns about the future of musical sources as well as scientific prospects, as past editions are methodologically outdated and require updates. These issues can be visualized in the graph below, which presents the main challenges for musicology in Valencia, such as lack of funding, difficult access to private archives, weak institutionalization, and conservation problems (Figure 1).





Conclusions:

- **Threat to musical sources:** Both 17th-century musical documents and other musical sources are at risk, mainly due to issues with access, preservation, and funding.
- **Digitization as the key to the future:** The digitization process is the main hope for saving these sources and ensuring their accessibility to researchers.
- Uneven conservation status of various collections: Liturgical collections are in better condition than some others, particularly manuscripts on paper, which are in poor condition and harder to access.
- **Need for research modernization:** Existing methods and catalogs require modernization to keep up with contemporary research standards.

It is worth adding that in the period between the meeting in Wrocław and the publication of this report, an agreement was reached between the Valencia Cathedral Archives, the government and the Conservation Institute, providing security for the sources discussed.

Contribution by Marek Bebak (Jagiellonian University)

Saved or lost? On the study of the musical culture of the Carmelites in the Polish-Lithuanian Commonwealth based on preserved sources and databases

The author addressed the issue of the discontinuity of statehood in a given country, using Poland as an example, in relation to the possibility of conducting research on musical culture in Poland. The focus was on the destruction of musical sources due to natural disasters, wars, partitions (1772, 1793, 1795), monastery dissolutions, as well as the actions of collectors and musicologists. As a result, the surviving collections were widely scattered across different regions in Poland and abroad, with many completely lost (e.g., **the royal music collection**). **In this situation, historical resources such as musical inventories and provenance notes are key sources of information.** These are valuable sources of knowledge about lost musical collections. In the example presented by the author, concerning the Carmelite order, information about musical ensembles is obtained through the analysis of chronicles and musical inventories, as the original musical sources have been lost. Therefore, **the reconstruction of the repertoire** plays an essential role in this research process, especially in



the case of Carmelite ensembles from the 17th and 18th centuries. This reconstruction is possible thanks to databases such as RISM, although the data they contain are sometimes incorrectly transcribed. The author emphasized **the importance of reconstruction**, not only as a means of incorporating the history of music into museum or ecclesiastical narratives or creating new programs for performers but also as a way of integrating Carmelite musical culture into the broader framework of European cultural heritage. **The challenges** that arise in this regard include the need to protect monastic musical heritage and foster international cooperation with various institutions. In the strictly musicological realm, this involves identifying compositions and producing critical music editions.

The following mind map outlines the main issues related to the loss of musical sources and the tools used for reconstruction, such as inventories, provenance, or the RISM database (Graph 4).



Conclusions:

- **Dispersal and destruction of sources:** The challenges related to studying early musical culture in Poland stem from numerous destructions, political upheavals, and the dispersal of sources. Many musical collections have been lost.
- **Reconstruction is possible, though limited:** Despite limited sources, it is possible to reconstruct the repertoire, particularly of monastic ensembles like the Carmelites, through the analysis of inventories and provenance. Databases such as RISM serve as valuable tools in these studies.
- **Cultural heritage significance:** Reconstruction is crucial for reviving forgotten cultural heritage and for contemporary artistic projects, such as concerts or sound installations in museums and churches.

Contribution by Hana Studeničová (Slovak Academy of Sciences)



Renaissance Music Sources in Slovakia and Problems of their Preservation and Accessibility to Researchers

The author addressed the research issues in Slovakia by presenting them through the example of musical sources from the Renaissance period, which are available in various institutions such as the Slovak National Archives, the State Archives in Bratislava, city archives, and libraries. She identified three types of sources found in these institutions:

- Complete musical collections from one institution or location,
- Individual musical sources,
- Musical fragments, including polyphonic ones.

Due to the impacts of war or the aging of the repertoire and its repurposing as waste material (e.g., covers for other sources), musical sources are often dispersed. This fragmentation is also evident within collections located in different places, with their origins not always well identified. These issues raise specific research problems, particularly methodological and conservation-related ones. As an example, the author cited the City Archives in Bratislava, which houses musical fragments (one part still as the cover of the municipal books, another part were removed and these fragments are deposited separately in fragments collection in other institution). The difficulties related to the fragmentation of music sources (e.g., municipal account books, testament books, and musical inventories) are linked to their distribution among different researchers. Another problem highlighted was the lack of comprehensive study of written sources, including the absence of a unified approach to cataloging, which underscores the need for the creation of music catalogs. The author noted that there are visible attempts to catalog medieval fragments (e.g., in the Cantus database), but this effort is not without its own challenges. The final issue addressed was **the** digitization of musical sources, which is being implemented on a limited scale due to a lack of funding.

The following graphic illustrates **the hierarchy of problems** associated with the research and conservation of Renaissance music sources in Slovakia. At the center is the main category– "Musical Sources", with key issues branching out: conservation, digitization, fragmentation and dispersion of sources, and the lack of cataloging standards (Figure 5).



Hierarchy of Issues in Renaissance Music Source Research in Slovakia



Conclusions:

- Insufficient conservation and protection of musical sources are evident in the archives and libraries in Slovakia: This issue is particularly critical for musical fragments, which are often scattered and damaged, and the lack of proper digitization hinders their research and preservation.
- **Fragmentation of sources:** Fragments originating from the same collection are dispersed across various institutions, further complicating their study.
- Lack of standards and funding: There is a shortage of consistent rules regarding the cataloging of musical sources, and limited funding prevents the execution of extensive conservation and digitization projects.

Contribution by Lyra Kastrati (Prenk Jakova - Kosovo / University of Zagreb - Croatia)

Preserving and Accessing Women Composers' Musical Heritage

Studies on the compositional work of women are gaining increasing momentum, especially in recent decades, with a particularly noticeable rise in the area of sources from the Romantic era. The main research issues highlighted by the author are sources, specifically their **dispersion and issues linked to documentation**, which result in an insufficient understanding of the achievements of historical women composers. Another issue is the varying formats in which resources are processed, significantly hindering access to these materials. For instance, **the compositions of Catherine Hamilton**, which are located in correspondence archives, illustrate how the music of female composers ends up in unexpected places and how challenging it is to access these musical sources. Another issue is the **formats** in which resources are processes (oftentimes existing only in manuscript form), significantly hindering access to these materials. During the discussion, involving contributions from Rebekah Ahrendt, Marek Bebak, Grzegorz Joachimiak, Ferran Escrivà-



Llorca, Balázs Mikusi, Agnesse Pavanello, Emilio Ros-Fábregas, Cristina Scuderi, Marianna Siatkowska (Kowal), Hana Studeničová, Natalia Syrotyńska, and Rodolfo Zitellini, several other issues were raised, including the insufficient awareness of what various institutions actually hold. Another issue discussed was **the difficulty in accessing musical sources**, because of the lack of cooperation with institutions that possess these musical resources, which, as noted, **often have limited trust in sharing their collections**. It was suggested that this should be approached diplomatically. The discussion also highlighted the need for modifications in the laws regarding access to musical sources, as well as **support for the digitization and preservation of resources**, as there is still **a lack of funding for these initiatives**. Digital copies are not eternal, and durable digital solutions must be developed **to ensure their secure archiving**.

The following cause-and-effect diagram (fishbone diagram) illustrates the main problems related to access to the music of women composers. Each branch represents a category of causes (such as "Lack of Documentation" and "Difficulties in Digitization"), while individual "bones" indicate specific reasons leading to the marginalization of women composers in education and music (Figure 2).



*No recording could perhaps replaces by Lack of professional recordings!

Conclusions:

- Accessibility issue: There is an urgent need to increase access to collections through digitization, the creation of metadata, and supporting smaller institutions in discovering what they possess.
- **Need for an awareness campaign:** Raising awareness of these issues at the international level is essential to gain political and financial support.
- International cooperation: A large-scale international project focused on digitizing the musical sources of women composers is needed to preserve their artistic work for future generations.

As a summary, **the problem tree diagram** (Diagram 1) below presents the key issues threatening musical sources and the main problems associated with this threat, such as:

- Lack of access and source dispersion: The incomplete availability of collections is often linked to their dispersion across various institutions.
- Insufficient conservation and cataloging standards: It was noted that various



collections, particularly lesser-known ones, suffer from a lack of adequate conservation standards and inconsistent cataloging.

- Lack of digitization: Digitizing sources could lead to better access and protection.
- **Lack of funding:** Insufficient financial resources for conservation and digitization pose a significant barrier to securing and making these sources accessible for the future.



III. Regulations regarding the preservation and access to music sources

Contribution by Cristina Scuderi (University of Milan)

Designing a Digital Prosopographical Resource as a Support for the Reconstruction of Tartini's School of Nations: issues and challenges

The topics for discussion were presented by the Author using the example of an international research project in which she participates, concerning Giuseppe Tartini's School of Nations. It encompasses three main research areas:

- The reconstruction of the School in the context of patronage,
- The use and reception of Tartini's didactic materials,
- The transmission of music through printers and copyists.

Three key research areas were selected:

- Graz: focusing on the reconstruction and influence of didactic activities,
- **Basel**: the use and reception of didactic materials,
- **Greifswald**: the transmission of music through printers (with the involvement of Ljubljana).

The digital prosopographical resource project includes biographical data of students, their musical works, and digital editions of Tartini's compositions and pedagogical writings. **It utilizes linked open data** to analyze students' careers, compare musical genres and compositional patterns, and map the transmission of musical knowledge in a pan-European context.

The challenges addressed in the project include:

- Identifying the students,
- The duration of their studies at Tartini's School,
- The mobility of students between countries,
- Manuscripts written by the students.

These challenges are addressed through a methodology of musicological research supported by the use of new technology-based tools:

- Texts: Using **Transkribus** with TEI-format editing and the capabilities offered by the Oxygen-XML editor,
- Music: Utilizing music transcription software and ultimately encoding in the MEI format,
- Infrastructure: Developing user-friendly tools like **OMR (optical music recognition)** plugins,
- **DigiTAR**: A digital archive, including prosopography, and editions of pedagogical writings,
- Identification of students: Collecting and processing the names of students, teachers, and other individuals connected to Tartini's School (creating an onomasticon) to analyze teaching genealogy, relationships, and the migration of students between countries.

A significant challenge, however, lies in finding a platform for long-term data storage, as there is currently a considerable problem ensuring the project's continuation after the end of its funding.

The following diagram illustrates how the various research areas are interconnected, forming a coherent network of interdependencies within the project (Figure 6).



Dependencies between research areas in the Tartini project



Conclusions:

- **The project is multi-layered**, covering various educational, technical, and genealogical aspects.
- **The key research areas** differ between cities but are interconnected as they all concern the reconstruction, transmission, and reception of Tartini's didactic materials.
- Technical and research **challenges** involve the identification of students, their mobility, and the proper digitization of materials, requiring advanced technological tools (Transkribus, MEI, OMR).

Contribution by **Patryk Frankowski** (Museum of Musical Instruments, branch of The National Museum in Poznań)

Preserving musical instruments through digitalization as source for research, education and performance practice

Vast number of musical instruments in collections are inaccessible to the general public and require special access for professionals. Transferring entire collections into the digital domain would allow for broad access to resources, bypass subjective selection of exhibits, and provide full data on instruments to interested parties. The digitization process should include high-resolution photos, complete 3D scans, CT or neutron imaging scans, precise measurements, and sound samples. An important component is gathering information on provenance, attribution, acquisition, and the usage history of the instruments. Such a digital database would benefit both researchers and musicians, as well as enthusiasts of early music. In particular, it would enable **quick and precise data collection without the need for physical access to the objects, and also allow the recreation of an instrument in case of its destruction**. The speaker mentioned efforts to secure funding from the European Union and to develop best practices for such projects. The following flowchart (Diagram 2)



illustrates the process of digitizing musical instruments, from selecting the collection, through the various technological stages (high-resolution photography, 3D scans, CT/neutron scans, sound samples), to the final step of data compilation and digital preservation. The diagram also shows the benefits of each stage, such as wider access, research opportunities, comparative analysis, and object preservation.





Conclusions:

- **Increased access and research efficiency:** Digitization enables broad access to instruments without requiring physical contact. This, in turn, facilitates rapid comparison of instruments and access to complete technical information.
- **Digitization as protection against loss:** Transferring collections to the digital domain serves as a form of safeguarding in case the original objects are destroyed.
- Value for different audiences: Not only researchers but also musicians, conservators, and music enthusiasts can benefit from easy access to detailed information about the instruments.

Contribution by Mark Saccomano (Universität Paderborn)

Enhancing Access and Interoperability of Digitized Musical Resources: Towards Standardization and Workflow Development

The author addressed the issue of stimulating research on early music through access to resources in digital formats. It is crucial to introduce standards and improve work processes to enhance the accessibility, interoperability, and reusability of sources and digital artifacts.



Research is being conducted (in Paderborn, Oxford, Beethoven-Archiv) on a data model that allows selecting musical excerpts for commentary, **specializing the Open Annotation model for musicological research**. However, several questions arise, including how musical annotations should compare to textual annotations and what forms artifacts supporting music research should take in a digital environment.

The author presented a **data model for musical annotations** and demonstrated its use in an application that emulates the work of a musicologist. The model was designed to account for repetition and variation, different instrumentation, and resources in various media formats. This model complies with *the Functional Requirements for Bibliographic Records* (FRBR), ensuring interoperability. Examples of the model's application in projects include MEI-Friend and E-Laute, where **digitization** and **encoding of musical resources** play a significant role. The discussion, involving Rebekah Ahrendt, Patryk Frankowski, Grzegorz Joachimiak, Agnesse Pavanello, Emilio Ros-Fábregas, Marc Saccomano, Cristina Scuderi, and Steffen Voss, focused on issues such as:

• Finding appropriate tools for projects and standards

We are in a phase of consolidation, with many ongoing experiments–perhaps too many– that sometimes lead to wasted time and resources, with data not being utilized. How do we start using interoperable tools, preserve data, and connect separate databases? There have been initiatives for musical instruments (e.g., MiMO, Europeana), but later, everyone went their own way. An ideal scenario would involve introducing a standard, but there are complexities, including institutional issues, image ownership, and a lack of description, conservation, and imaging standards.

• The role of professional organizations in creating guidelines

There have been attempts by professional organizations to establish standards, but they have yet to gain sufficient momentum to become mandatory. This leads to the question of whether descriptive standards with guidelines should exist, as the adoption of standards is not rewarded in the current research environment. While we still lack standards in substantive descriptions (e.g., for musical instruments), authoritative files (such as those from the Library of Congress for describing musical instruments) could be crucial. However, processing massive amounts of data, such as CT scans, poses a challenge.

• Tool selection and funding

We are still at a crossroads regarding the choice of appropriate research tools, professionalization of technology, and project compatibility. It's about both accessibility and funding. It seems that using various open-source and commercial platforms is not always enough, as specialized knowledge in both musicology and IT is often needed.

• Long-term data archiving

Critical text editions have a good development perspective, but we must work closely with national libraries that have better support structures. Perhaps we should think of our research data as endangered sources? This is undoubtedly a question of long-term archiving of research data, which arises more frequently in various countries and institutions. Music presents many unique challenges due to the state of development of standard tools for digital preservation and editing, as well as the communication and storage of data.



In the following diagram of problems and challenges (mind map), the main issues and their related challenges are presented. The red nodes represent key problems such as standardization, interoperability, data archiving, research tools, tool selection, and funding. The blue nodes represent the specific challenges associated with each of these problems (Diagram 3).

Problem and Challenge Diagram (Mind Map)



Conclusions:

- **The need for standardization:** There is a strong need for standards in both digitization processes and research on encoding musical compositions to increase interoperability and data reusability.
- **Interoperability as a priority:** To make early music research effective, it is necessary to combine tools and research methods that work consistently.
- **Challenges with tools:** There are many tools (often experimental) in music research, but the problem lies in the lack of standardization and difficulties in accessing appropriate technologies.
- **Problems with long-term data storage:** Solutions must be found to enable the permanent storage of research data, which can also be seen as "endangered sources" in this context.



In summary, the results of this part of the discussion point to the crucial role of digitization, both in terms of protecting source materials for music and facilitating research and access to data. There is a strong need to unify tools and research methods to increase consistency and collaboration between different studies and groups. **The key problem to be solved involves technological, standardization, and long-term research data storage challenges.** The graph below illustrates this (Graph 3).

Preservation and Access to Music Sources - Key Issues to Address



IV. Technological challenges in the preservation and access of musical sources

Contribution by **Olivier Lartillot** (RITMO, University of Oslo)

Harmonizing Tradition with Technology: Enhancing Norwegian Folk Music through Computational Innovation

The author presented a description of their research project, which utilized audio recordings (343 tapes) as sources for transcription and music analysis. The project was carried out in collaboration with the Norwegian National Library and resulted in 20,000 pieces of music processed using the **AudioSegmentor** tool that was developed for that purpose. The aim of the project is focused on **the development of computer tools** to preserve and enhance the cultural significance of music repertoires, particularly Norwegian folk music.

The recordings are cataloged online. The addition of metadata, linked to metadata authorities such as VIAF (Virtual International Authority File) and Wikidata is under



consideration. Transcriptions are being automated using *muScribe* a tool developed for the project that allows for the automated transcription of audio files into scores that reflect performance aspects. The resulting score is to be expressed in the MEI format, and the project is investigating new innovative methods to align the notes from the MEI encoding with the correspondings notes in the audio recordings.

Regarding musical analysis, the project addresses the issues of musical style with a focus on the intertextuality of music. One objective is to automatically detect correspondences between pieces in the catalog (e.g., quotations, imitations, and other mimetic phenomena). Advanced thematic catalogs could also be created, allowing for the visualization of the music collection.

Questions that emerged during the discussion concerned the challenge of connecting music collections with repositories.

The flow diagram below (Diagram 4) illustrates the main stages of processing Norwegian folk music in the described project, starting from audio recordings, through automated transcription and cataloging, to advanced musical analysis and the creation of an interactive thematic catalog.



Conclusions:

- **Innovation of the project:** It is crucial to emphasize the innovative approach to processing Norwegian folk music, both in terms of automated transcription and advanced methods of music analysis.
- **Challenges:** Integration with international databases and the issue of metadata are significant challenges that the project seeks to address by developing new metadata



formats and music processing techniques.

• Automation and accessibility: The design of tools such as AudioSegmentor and muScribe, which automate the transcription and analysis processes, increases the accessibility of music and facilitates its study.

Contribution by Natalia Syrotyńska (Ivan Franko Lviv University)

Challenges and Goals in Studying Ukrainian Monodic Repertoire

The author presented two issues concerning paleographical aspects of religious music and the compilation of sources from the territory of present-day Ukraine for creating thematic catalogs. Regarding the first issue, the author highlighted liturgical manuscripts from the 11th-12th centuries, where melodies were written using neumes. In the 16th-century liturgical sources, polyphony appears, along with the modern five-line musical staff. The library of the Lviv Brotherhood played a key role in preserving these materials, and the *Irmologions* were used not only for liturgical purposes but also for educational ones, modeled after Jesuit college and Protestant schools curricula. Lviv, then part of the Polish-Lithuanian Commonwealth, served as a bridge between Western and Eastern cultures, as evidenced by preserved sources that reflect the specific characteristics of Ukrainian monody combined with Gregorian chant. An open question was raised regarding how to establish common melodic models for medieval melodies.

The second issue concerns the lack of a database of Lviv's 16th-18th-century liturgical manuscripts. There is also a need to initiate digitization and mapping of Lviv's musical sources to secure and make them accessible for further academic research. During the discussion, it was emphasized that knowledge of Latin is essential for the project to move forward, and it is crucial for future cooperation with RISM. Below is a mind map presenting the technological challenges in preserving and accessing musical sources. It highlights key issues and connections, such as the paleographical problems of religious music, the lack of manuscript digitization, and the role of *Irmologions* in education and liturgy (Graphic 7).





Mind Map: Technological Challenges in the Preservation and Access of Musical Sources

Conclusions:

- **Similarities between Ukrainian monody and Gregorian chant:** There are common melodic and intonational models between Ukrainian liturgical monody and Gregorian chant, which is a significant area of musicological research.
- Lack of full manuscript digitization: There is an urgent need to create a comprehensive database and digitize Lviv's manuscripts to facilitate research and preservation.
- **Role of Irmologions:** Irmologions served not only a liturgical function but also an educational one, underscoring their importance in the development of Ukrainian musical culture and education.
- **Digitization projects:** Although some digitization projects have begun, they require continuation to ensure their protection and accessibility.

Contribution by Grzegorz Joachimiak (University of Wrocław)

The Role of Digitization in Preservation and Reconstruction of Historical Sources: A Retrospective Overview and Perspectives

The collections of Aleksander Poliński were of great importance to the history of Polish music. His collection included approximately 3,000 titles and musical instruments, but it was almost entirely destroyed by fire after the Warsaw Uprising in 1944. A 16th-century manuscript of keyboard tablature from the Holy Spirit Monastery in Kraków, which was also housed in the collection, was destroyed as well, although it had been microfilmed beforehand. The



microfilm from Harvard University's Isham Library contains a poor-quality copy of the source, but for years after World War II, it was the only existing copy. The discovery by the Author of a second copy in Berlin is extremely significant for the reconstruction efforts, but it also leads to other important conclusions:

- Photographs and pre-war microfilms are invaluable, especially if the original sources were destroyed.
- Both microfilms and modern digitization preserve the appearance of the sources at a specific point in time, including their content, which is often lost during conservation processes.
- Digitization plays a crucial role in protecting sources from destruction.

The discussion, which included contributions from Rebekah Ahrendt, Ferran Escriva Llorca, Balazs Mikusi, Emilio Ros-Fabregas, and Rodolfo Zitellini, began with open-ended questions about other examples of such collections of photographs or microfilms, as well as the possibility of comparative analysis between older images of sources and their current state. Other examples of archives with rich collections were also mentioned, such as the 400 microfilms of Dragan Plamenac now held at Yale Music Library, the microfilm archive from Kassel, and examples from Spain. **How can we discover and connect these collections?** In the context of focusing on digitization, we may soon find ourselves in a situation where we lose track of the existing film archives, and with them, much information, including copies of source contents.

It was also noted that different imaging techniques offer various ways to view the source. Some techniques actually make the sources more legible, so items captured on microfilm may reveal information that would otherwise remain unreadable. Therefore, it is crucial to preserve these collections of films and photographs because of the valuable information they may contain, which can be achieved through collaboration with RISM. Microfilms record information that no longer exists, and today they should be recognized as **a form of "endangered sources".**

The mind map below presents the connections between key issues related to the preservation of musical sources. At its center is "Preservation of Musical Sources", from which major categories such as "Microfilms", "Digitization", "Imaging Techniques", and "International Cooperation" branch out, linked to more detailed topics (Diagram 5).



Mind Map: Protection of Musical Sources



Conclusions:

- Microfilms are crucial for preserving information that may otherwise be lost
- There is a need for better preservation and conservation of microfilms and photographs
- Imaging techniques can help uncover hidden details on microfilms
- **Digitization** is a key tool for source protection, but it is only a way of "freezing" the source's condition in time, similar to microfilms
- **Photographs and microfilms** from the pre-war period are often the only source of information about materials destroyed during World War II
- Pre-war microfilms and photographs can serve as **a basis for supplementing catalogs of lost sources** and analyzing compositions.

In summary, it is essential to recognize that digitization is one of the fundamental needs as a key element in preserving and increasing access to musical sources. Examples include the Lviv manuscripts, microfilms, photographs, and digital transcription projects of Norwegian folk music. The most pressing issue seems to be **the insufficient digitization and**



conservation of key musical materials (manuscripts, microfilms, photographs), along with a lack of full international cooperation, which hampers the integration of databases and the analysis of music with access to a broad range of resources.

Final Conclusions

In the concluding discussion, **Balázs Mikusi** suggested that for new projects related to the development of music sources, the RISM-Muscat system should simply be chosen. It is becoming increasingly intuitive and user-friendly, which enhances its durability and facilitates the popularization of the RISM system online. Regarding ontology, **Mark Saccomano** proposed reusing available resources and linking them wherever possible, avoiding the creation of something "new" each time. **Steffen Voss** highlighted some flexibility of the RISM-Muscat system due to the needs of certain libraries, which generally does not pose a problem. Starting from 2026, it is expected that **the RISM editorial team will transform into a fully remote operation**. This process may be expanded to increase the integration of more sources, raise awareness, and improve the visibility of RISM, as well as enhance awareness of remarkable collections.

Types of Musical Sources

Manuscripts, prints, phonographic materials, musical instruments, audiovisual media (including microfilms and photographs). Also included are written sources about music, such as correspondence, press materials, concert posters, and programs, as well as manuscripts and prints where musical materials have been repurposed as filler for bindings.

Types of Threats to Musical Sources

Flood, fire, theft, vandalism, dissociation (digital materials), obsolete technology, lack of awareness, and the absence of legal tools for protection.

The term "endangered musical sources" refers to materials that are in a specific situation or subject to actions that may lead to the destruction of the source, for example:

- Music collections stored in conditions unsuitable for their specificity
- Collections with limited access, such as private or church music collections
- Materials slated for removal (microfilms, old source photographs)
- Collections exposed to destruction due to war, natural disasters (fires, floods, earthquakes), or other unforeseen circumstances
- Collections at risk of theft, vandalism, or other damage
- Resources awaiting the establishment of a deposit agreement model
- Resources exposed to ignorance or lack of awareness by those with access to them
- Lack of conservation and cataloging standards
- Lack of financial means for conservation and digitization
- Problems with long-term storage of digital data



Who should be our allies in protecting musical heritage?

Collaborators include IT specialists, librarians, musicologists, and working groups from RISM and IAML.

What are our goals for raising awareness?

Close cooperation with highly specialized organizations, such as **IAML** and its national groups, as well as other associations of librarians and archivists, such as the International Council on Archives, **IASA**, **IMS**, **AMS**, other national musicological societies, **MiMO**, museum organizations, and RISM working groups or national groups. Partners include: **ICCROM**, **ICCROM ReORg**, **Culture Action Europe**, **Europa Nostra**, **European Heritage Hub**, and other lobbying organizations, **UNESCO**, and **the European Music Council**.

How can musicologists become allies?

We can communicate what we do, show how we can contribute to valuing heritage, facilitate cooperation and access to resources, help institutions understand the importance of their collections, make them public, and tell stories that attract people, funds, or fame for the institution.

Protocol for Information Exchange with RISM

Balázs Mikusi pointed out the importance of recognizing the strength and reach of RISM's national and working groups, as well as IAML. It is crucial to emphasize this and ensure that communication lines are clearly defined.

Technological Conservation and Risk Management for Music Collections

It is essential to document the music source before any conservation work to minimize the risk of potential problems. **Balázs Mikusi** noted that there is a lack of support for protection and conservation, let alone restoration. Digitalization standards: **Agnese Pavanello** mentioned the high standards in Italy, where **an institute of experts in the history of the book exists**. This demonstrates how musicologists can directly impact the protection of sources. **More educational programs and more funds for conservation** are recommended.

Activist Moment: Difference Between "Project" and "Infrastructure"

Balázs Mikusi emphasized the difference between project-based research and actual structural funding. In the 2010s, the shift towards project-based funding undermined research stability. Therefore, building permanent funding structures is safer for the protection of musical heritage.

Political/Legal Climate in the EU

Discussions during the meeting in Wrocław and conducted surveys indicate that many areas remain legally unregulated in both EU countries and member states, causing the protection and conservation of cultural heritage materials, including musical ones, to remain unsecured. The major issues include access to private and church collections, deposits, and rights to share data when digitizing private resources.

Access to Digitization Technology in EU Countries

Access to digitization of source materials is not widespread. Primarily, institutions executing research grants or those with infrastructure and trained personnel are conducting such activities. Countries in the ITC group, as well as smaller library units within wealthier EU



countries, frequently report issues with access to digitization. However, there is a growing trend among people and various specialist groups wanting to collaborate on musical heritage using new technologies. Digitization not only secures sources but also enables their widespread presence and free access to every user.

Support for Conservation

Before digitization, each source must undergo a conservation status check, which significantly burdens conservation workshops. Therefore, there is an increasing demand for qualified personnel who can support the conservation of musical sources and their preparation for digitization.

FURTHER CHALLENGES

One of the examples of musical-architectural reconstruction presented was the 18th-century organ created by Michael Engler the Younger (1688-1760) in the Church of St. Elizabeth in Wrocław. The instrument was destroyed by fire in 1976, but it was reconstructed in 2022 based on Engler's original design. This monumental symbol of musical instrument reconstruction was also witnessed by members of WG2 during their meeting in Wrocław (Photo 1).



This serves as a tangible example of many issues discussed in WG2. It enables a clearer vision of the future and helps in shaping a perspective concerning the care of European cultural heritage, particularly in maintaining awareness of the role and significance of early music.

There are many other examples of such reconstructions and efforts to preserve musical heritage, but in the context of the conclusions drawn from the discussions, certain perspectives and recommendations for further actions by WG2 SOURCES can be outlined. The "Problem Tree" below (Diagram 6) illustrates the key challenges related to the preservation of musical sources, focusing on the lack of conservation standards, funding,



digitization, and the dispersal of sources, as well as possible solutions (standardization, digitization, international cooperation).



WG2's upcoming efforts will primarily focus on issues related to the digitization of "endangered sources", which should be compiled into a database. Discussions on the formats and standards for making musical resources (not only manuscripts and prints but also other early music sources) available in digital libraries will also be crucial. Additionally, there should be discussions on the possibilities of integrating these resources and fostering international cooperation.

In the context of the discussions conducted in WG2, it should be noted that an increasing number of specialized databases are being created, but their main problem lies in **maintaining the developed infrastructure after the project has ended**.

Another issue is the scope of the data that is being processed. Various initiatives are emerging that aim **to collect information about endangered, destroyed, lost, or dispersed sources**, but this is not a coordinated effort. It would be beneficial if such coordination could be achieved.

Further problem gradually emerging from the discussions is **the lack of data** enabling musicological analyses using computational methods. It can be observed that musicologists dealing with musical sources, especially those focused on early music, **mainly concentrate on creating metadata** (e.g., attribution, origin, dating, cultural context, etc.).

We also have an increasing number of scans in digital libraries along with the metadata attached to them. Considering the need to safeguard these sources, the necessity for **digitization remains crucial** (this concerns written sources, musical instruments, musical iconography e.g. in churches, castles and palaces, etc.). In this context, we should also remember about the sources that function in the form of oral culture and **musical recordings can protect them**.



On the other hand, beyond scans, musical recordings, and metadata, **we need data as a source** for musicological analyses using computers and **corpora**. Preparing data as sources for research requires broad engagement and close **collaboration between musicological and computer science communities**.

One of WG2's upcoming challenges will be fostering discussions on safeguarding endangered sources (addressing the process of preparing materials and placing them in digital libraries) as well as exploring the possibilities of creating corpora and preparing data for analyses using computers, in the context of international collaboration.