



Consortium for research data on material and immaterial cultural heritage (NFDI4Culture)

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1) Research domains, scope and objectives

Digital data on **tangible and intangible cultural assets** is an **essential part of daily life, communication and experience**. It has a lasting influence on the perception of **cultural identity** as well as on the **interactions between research, the cultural economy and society**. The **long-term preservation** and **reliable availability** of research data from the cultural heritage domain in line with the **FAIR and CARE¹ principles** are fundamentally important, not only for future academic success in the humanities but also for the **cultural self-understanding of individuals, groups and society** as a whole.

The research landscape addressed by NFDI4Culture is characterized by strong differentiation. Research units comprise university institutes, art colleges, academies, galleries, libraries, archives and museums of varying sizes and with very different prerequisites. Up to now, no coordinated professional research data management on a national level exists in this area. In a unique effort, **this community of interest is tied together for the first time** to create a user-centered, research-driven infrastructure that will cover a broad range of research domains from **musicology, art history and architecture to performance, theatre, film, and media studies**. NFDI4Culture consists of a geographically, thematically and institutionally balanced network of 9 co-applicants and 62 participants. It aims to **ideally represent the broad spectrum of different actors in the cultural heritage domain**. The co-applicants comprise four universities (Cologne, Heidelberg, Marburg, Paderborn), three infrastructure institutions (FIZ Karlsruhe, TIB Hannover, SLUB Dresden), Germany's largest institution in the GLAM sector (Stiftung Preußischer Kulturbesitz) and an Academy of Science. This group is joined by 11 academic societies each representing one of the research domains that together make up the community of interest.

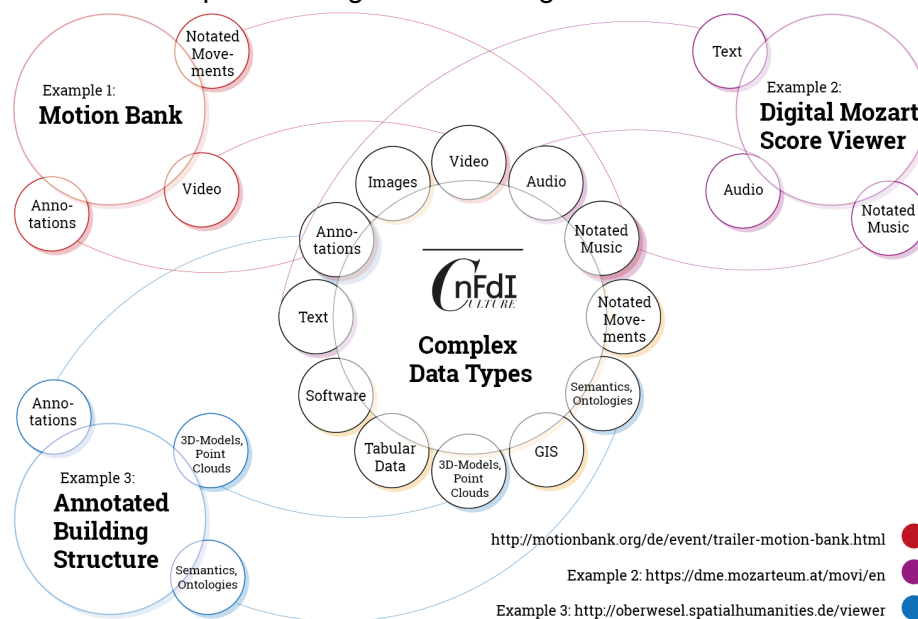
Driven by active research interests and the needs of its community **NFDI4Culture was initiated by the academic societies** and conceptualized in close cooperation with the provider institutions. It has gathered strong support ranging from individual researchers up to high-level cultural heritage organizations such as the UNESCO and the International Council of Museums. It includes **participants that contribute large-scale subject-specific research infrastructures** (like RISM or prometheus). Key institutions in the field of international research have expressed their strong interest for collaboration. This ranges from the Getty Research Institute to subject-specific research data initiatives such as the Music Encoding Initiative (MEI) and Pelagios Commons. Strong ties exist with **high-level international information infrastructure providers** such as ORCID, DataCite, large-scale data-driven projects such as Time Machine and international organizations such as the Open Knowledge Foundation and Wikimedia. On this basis, NFDI4Culture will **carry out innovative measures that promote a cultural change** towards a more reflective and sustainable handling of research data and at the same time boost **qualification and professionalization** in data-driven research in the domain of cultural heritage. This will create a **long-lasting impact on science, cultural economy and society** as a whole.

¹ Collective benefit, Authority to control, Responsibility, Ethics; cf. Global Indigenous Data Alliance: Care Principles for Indigenous Data Governance, <https://www.gida-global.org/care>.

2) Types of research data and requirements for RDM in cultural heritage

The research data targeted by NFDI4Culture is subject to specific requirements: First, it is necessary to differentiate between **digital representations** (reproductions) of cultural assets, including their metadata, and **procedural research data** resulting from research processes. Both stand in a dynamic interdependence. Second, it must be taken into account that digital representations of cultural assets can become intangible cultural assets themselves (e.g. due to possible loss of the original). Third, tangible and intangible cultural assets are **subject to complex legal and ethical conditions**. Fourth, research data as an outcome of research processes on cultural assets is **closely tied to the cultural economy** that often utilizes the results for economic purposes. The **cultural products created from economic use can themselves become new objects of research**. Users in NFDI4Culture's community do not only generate data *about* their research objects – the research objects, their digital representations and their further use are bound together in constant exchange between science, economy and society.

Consequently, NFDI4Culture deals with **complex data types on two levels: (1) digital representations of cultural assets**, such as all forms of **2D digital reproductions** (paintings, sculptures, sheet music, photography, performed works of art, etc.), **3D models of cultural assets** (from artefacts to large man-made structures such as monuments and buildings) created by photogrammetric processes, laser-based 3D scanners or structured light systems, all types of **audio-visual data** (music, film, stage performances, etc.). And **(2) procedural research data**, such as **graphic formats** (raster and vector including image metadata), formats for the digital depiction of music, **computer-generated structures** of cultural assets on the basis of CAD/CAAD or rendering programs, computer-based simulations of cultural spaces or artistic performances, **encoding and annotation formats** (music encoding, image annotation, time tags, shape annotations for videos etc.), and a broad range of **metadata and semantic models** for the description of tangible and intangible cultural assets.

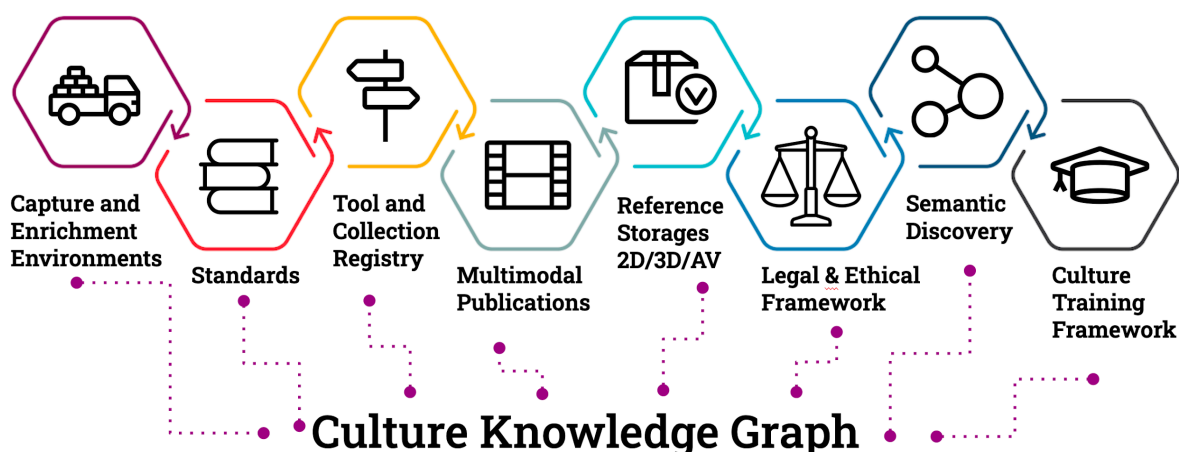


3) Task areas, measures and services

Against this background of **multimodal data types** in the cultural heritage domain 28 user stories² were drafted in **close dialogue between researchers** from the participating communities **and the provider institutions** and aligned to the research data life cycle. NFDI4Culture's work program consists of 7 task areas with 33 measures and 120 tasks. The planned services respond to users' needs from the level of data capture, collection and enrichment to the level of data analysis, data publication (taking into account complex ethical and legal questions), data reuse and training in code and data literacy.

² See https://nfdi4culture.de/images/us/NFDI4Culture_UserStoryAll.pdf.

Culture Information Portal



NFDI4Culture plans extensive opportunities for participation not only for users from the involved disciplines but also for artists and cultural workers from various fields of activity and representatives of civil society. The continuous development of the service portfolio in an open and transparent process is ensured by (1) **domain specific service monitoring**, (2) **regular forums** in each task area in which users and providers discuss and evaluate existing services and provide feedback for the task teams that develop the services, and (3) **specialized agencies** (like a *FAIR Clearing Agency*, a *Legal Helpdesk* or the *Culture Research Data Academy*) which give advice, collect additional user feedback and identify and communicate existing shortcomings in the service portfolio to the governance bodies. Further details on the work program are provided on our website.³

4) Mutual knowledge exchange, cross-cutting topics and digital innovation

Openness for collaboration, mutual assistance, sharing of knowledge and technology have been guiding principles of NFDI4Culture from the beginning. In a coordinated two-year effort, a network with distinct areas of responsibility and complementary fields of action was formed in the humanities that can best meet the different data domains and manifold user demands. NFDI4Culture is one of the initiators of the *Memorandum of Understanding* of NFDI initiatives in the humanities.⁴ In May 2019, the consortium published a comprehensive *Working Paper* and laid open its core topics and approaches for mutual discussion and exchange with the NFDI community.⁵ It is also a signatory of the *Berlin Declaration* and the *Leipzig-Berlin Declaration* on cross-cutting topics.⁶ The development of a transdisciplinary research data infrastructure through complementary consortia will enable the application of new research methods and foster digital innovation. For the field of cultural heritage, such methods may include the automated enrichment of digital representations of tangible and intangible cultural assets based on artificial intelligence, crowd-sourcing approaches to raise metadata coverage and data quality, semantic reasoning and knowledge discovery on federated cultural collections and new approaches in computer vision as well as music information retrieval which result in multimodally enhanced cultural (data) publications.

5) Expectations from the NFDI conference

We hope for a fruitful discussion and concretion of cross cutting topics (such as a common legal framework, plans for a joint AAI, exchange on operating models, certification schemes, introduction/enhancement of (new) academic credit systems etc.) and news on the current state of plans for the overarching NFDI framework.

³ See https://nfdi4culture.de/images/nfdi4culture_slides_at_a_glance.pdf.

⁴ See <http://doi.org/10.5281/zenodo.3265763>.

⁵ See <https://doi.org/10.5281/zenodo.2763576>.

⁶ Berlin Declaration (2019): <https://zenodo.org/record/3457213>; Leipzig-Berlin Declaration (2020): <http://doi.org/10.5281/zenodo.3895208>.

6) Co-Applicants and Co-Spokespersons of the consortium

Co-Spokespersons	Institution
Task Area 1: Data capture and enrichment of digital cultural assets	
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Task Area 2: Standards, data quality and curation	
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Dr. Christian Bracht <i>Art History, Information Infrastructure</i> bracht@fotomarburg.de	Philipps-Universität Marburg, Deutsches Dokumentationszentrum für Kunstge- schichte, Biegenstr. 11, 35037 Marburg
Task Area 3: Research tools and data service	
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Daniel Röwenstrunk <i>Business Informatics, Musicology</i> roewenstrunk@uni-paderborn.de	Universität Paderborn, Zentrum Musik – Edition – Medien Warburger Straße 100, 33098 Paderborn
Task Area 4: Data publication and data availability	
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Task Area 5: Overarching technical, ethical and legal activities	
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Task Area 6: Culture Research Data Academy	
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Task Area 7: Governance and administration	
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An exhaustive list of all partners of NFDI4Culture can be found on our website:
<https://nfdi4culture.de/#partner>