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Trieste (Italy) - Maribor (Slovenia)
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Organizing Secretariat: International Institute for Archival Science of Trieste and Maribor
c/o State Archives of Trieste
Via A. La Marmora, 17 - I-34139 Trieste - Italy
e-mail: peter.klasinc@almamater.si

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Abstract

Purpose: *This paper investigates the Italian National Plan for the Digitization of Cultural Heritage (2022–2026), Italy's most comprehensive framework for coordinating the digitization of its cultural assets. Developed within the broader European and international digital agendas, the Plan addresses the longstanding fragmentation of Italy's digitization efforts by establishing a unified policy and infrastructure to enhance accessibility, interoperability, and long-term preservation.*

Methodology: *The study adopts a qualitative and analytical approach based on a review of the Plan's official documentation, including its accompanying Guidelines for the Digitization of Cultural Heritage, and relevant European policy sources. It examines the Plan's policy background, strategic framework, and implementation mechanisms, focusing on how its three strategic pillars—technology, processes, and people—interconnect to create a sustainable digital ecosystem. The analysis also contextualizes the Plan within the broader goals of the National Recovery and Resilience Plan (NRRP) and the European data space for cultural heritage.*

Results: *The analysis reveals that the Plan transforms digitization from a series of isolated technical initiatives into a systemic and participatory process. It expands access to cultural heritage by promoting user-centered and inclusive design, drives institutional digital transformation through standardized workflows and interoperable infrastructures, and fosters the creation of interconnected ecosystems of cultural data and services. The accompanying Guidelines establish methodological standards for data quality, metadata, and long-term preservation, ensuring coherence across archives, libraries, and museums. The Plan's implementation through NRRP-funded projects is expected to produce more than sixty-five million digital objects by 2026, made available via the national Infrastructure for Cultural Heritage (I.Pa.C.) platform.*

1 Stefano Allegrezza, University of Macerata, Italy, email: stefano.allegrezza@unimc.it.

Discussion: *The findings highlight the Plan's dual role as both a technological and cultural innovation. It not only modernizes the management of cultural resources but also promotes inclusivity, collaboration, and knowledge sharing across institutions. However, the success of the Plan depends on sustained investment, professional training, and governance capable of adapting to rapid technological change. By embedding digitization within a holistic policy and infrastructural framework, the Plan positions Italy as a European leader in digital cultural heritage. It demonstrates how digitization, when conceived as an integrated cultural process, can bridge tradition and innovation, ensuring that heritage remains accessible, sustainable, and relevant for future generations.*

Keywords: *Digitization, Digitalization, Cultural heritage, Guidelines, Cultural Institutions*

CONSERVARE IL PASSATO, ABBRACCIARE IL FUTURO: IL PIANO NAZIONALE ITALIANO PER LA DIGITALIZZAZIONE DEL PATRIMONIO CULTURALE

Abstract

Scopo: *Questo articolo analizza il Piano Nazionale di Digitalizzazione del Patrimonio Culturale (2022–2026), la più ampia strategia italiana volta a coordinare e sistematizzare la digitalizzazione dei beni culturali. Inserito nei più ampi quadri digitali europei e internazionali, il Piano definisce una politica nazionale e un'infrastruttura tecnologica finalizzate a migliorare l'accessibilità, l'interoperabilità e la conservazione a lungo termine del patrimonio.*

Metodologia: *Il contributo adotta un approccio qualitativo e analitico basato su una revisione della documentazione ufficiale del Piano, comprese le Linee guida per la digitalizzazione dei beni culturali che lo accompagnano, e le fonti politiche europee pertinenti. Esamina il contesto politico, il quadro strategico e i meccanismi di attuazione del Piano, concentrandosi su come i suoi tre pilastri strategici - tecnologia, processi e persone - si interconnettono per creare un ecosistema digitale sostenibile. L'analisi contestualizza inoltre il Piano nell'ambito degli obiettivi più ampi del Piano Nazionale di Ripresa e Resilienza (PNRR) e dello spazio europeo dei dati per il patrimonio culturale.*

Risultati: *L'analisi rivela che il Piano trasforma la digitalizzazione da una serie di iniziative tecniche isolate in un processo sistemico e partecipativo. Amplia l'accesso al patrimonio culturale promuovendo una progettazione incentrata sull'utente e inclusiva, guida la trasformazione digitale istituzionale attraverso flussi di lavoro standardizzati e infrastrutture interoperabili e favorisce la creazione di ecosistemi interconnessi di dati e servizi culturali. Le Linee guida allegate stabiliscono standard metodologici per la qualità dei dati, i metadati e la conservazione a lungo termine, garantendo la coerenza tra archivi, biblioteche e musei. L'attuazione del Piano attraverso progetti finanziati dal PNRR dovrebbe produrre oltre sessantacinque milioni di oggetti digitali entro il 2026, resi disponibili tramite la piattaforma nazionale Infrastruttura per il Patrimonio Culturale (I.Pa.C.).*

Discussione: *I risultati evidenziano il duplice ruolo del Piano come innovazione sia tecnologica che culturale. Esso non solo modernizza la gestione delle risorse culturali, ma promuove anche l'inclusività, la collaborazione e la condivisione delle conoscenze tra le istituzioni. Tuttavia, il successo del Piano dipende da investimenti sostenuti, formazione professionale e governance in grado di adattarsi ai rapidi cambiamenti tecnologici. Integrando la digitalizzazione in un quadro politico e infrastrutturale olistico, il Piano posiziona l'Italia come leader europeo nel patrimonio culturale digitale. Dimostra come la digitalizzazione, se concepita come un processo culturale integrato, possa colmare il divario tra tradizione e innovazione, garantendo che il patrimonio rimanga accessibile, sostenibile e rilevante per le generazioni future.*

Keywords: *Digitalizzazione, Patrimonio culturale, Linee guida, Istituzioni culturali*

OHRANJANJE PRETEKLOSTI, SPREJEMANJE PRIHODNOSTI: ITALIJANSKI NACIONALNI NAČRT ZA DIGITALIZACIJO KULTURNE DEDIŠČINE

Izvleček

Namen: *Prispevek preučuje Italijanski nacionalni načrt za digitalizacijo kulturne dediščine (2022–2026), najcelovitejše italijansko ogrodje za usklajevanje digitalizacije kulturnih dobrin. Načrt, razvit v okviru širših evropskih in mednarodnih digitalnih pobud, naslavlja dolgoletno razdrobljenost italijanskih prizadevanj na po-*

dročju digitalizacije, saj vzpostavlja enotno politiko in infrastrukturo, ki izboljšuje dostopnost, interoperabilnost in dolgoročno ohranjanje kulturne dediščine.

Metodologija: *Študija uporablja kvalitativni in analitični pristop, temelječ na pregledu uradnih dokumentov Načrta, vključno s spremljajočimi Smernicami za digitalizacijo kulturne dediščine, ter relevantnih evropskih politik. Preučuje politični okvir, strateško zasnovo in mehanizme izvajanja Načrta, pri čemer se osredotoča na povezavo treh strateških stebrov — tehnologije, procesov in ljudi — v ustvarjanju trajnostnega digitalnega ekosistema. Analiza Načrt umešča tudi v širši kontekst Nacionalnega načrta za okrevanje in odpornost (NRRP) ter evropskega podatkovnega prostora za kulturno dediščino.*

Rezultati: *Načrt digitalizacijo preoblikuje iz niza izoliranih tehničnih pobud v sistemski in participativni proces. Povečuje dostop do kulturne dediščine z vključevanjem uporabniško usmerjenega in inkluzivnega oblikovanja, spodbuja digitalno preobrazbo institucij prek standardiziranih delovnih procesov in interoperabilnih infrastruktur ter spodbuja razvoj povezanih ekosistemov kulturnih podatkov in storitev. Spremljajoče Smernice določajo metodološke standarde za kakovost podatkov, metapodatke in dolgoročno ohranjanje, kar zagotavlja skladnost med arhivi, knjižnicami in muzeji. Pričakuje se, da bo izvajanje Načrta prek projektov, financiranih iz NRRP, do leta 2026 prineslo več kot 65 milijonov digitalnih objektov, dostopnih prek nacionalne platforme za kulturno dediščino (I.Pa.C.).*

Diskusija: *Ugotovitve poudarjajo dvojno naravo Načrta kot tehnološke in kulturne inovacije. Načrt ne le modernizira upravljanje kulturnih virov, temveč spodbuja tudi vključenost, sodelovanje in izmenjavo znanja med institucijami. Uspeh Načrta pa je odvisen od trajnih vlaganj, strokovnega izobraževanja in učinkovitega upravljanja, ki zna slediti hitrim tehnološkim spremembam. Z vključitvijo digitalizacije v celostno politično in infrastrukturno ogrodje Italija s tem postavlja sebe v vlogo evropskega vodilnega na področju digitalne kulturne dediščine. Načrt kaže, kako digitalizacija, razumljena kot integriran kulturni proces, povezuje tradicijo in inovacijo ter zagotavlja, da dediščina ostane dostopna, trajnostna in relevantna za prihodnje generacije.*

Ključne besede: *Digitalizacija, Kulturna dediščina, Smernice, Kulturne institucije*

1 INTRODUCTION

Cultural heritage is not only the custodian of collective memory but also a strategic resource for social cohesion, innovation, and sustainable development. In recent decades, the profound transformations brought about by digital technologies have generated unprecedented opportunities for the preservation, accessibility, and valorization of cultural assets. The process of digitization, when conceived in a systematic and integrated way, enables heritage institutions to safeguard fragile objects, broaden access to culture, and stimulate new forms of knowledge creation and reuse. Italy, with its immense historical, artistic, and documentary wealth, has faced a pressing challenge: to design a national strategy capable of coordinating the digitization of its cultural heritage. The Italian *National Plan for the Digitization of Cultural Heritage (2022–2026),* (in Italian: *Piano Nazionale di Digitalizzazione del Patrimonio Culturale (2022–2026)*) (Italian Ministry of Culture, 2022a), launched and refined under the auspices of the Italian Ministry of Culture, represents the most ambitious attempt to address this challenge (Italian Ministry of Culture, 2022a, 2022b). It provides a framework for action, grounded in European digital agendas, that aligns Italy's priorities with the broader objectives of interoperability, accessibility, and long-term digital preservation (European Commission, 2010, 2011, 2021a, 2021b).

This paper examines the *Italian National Plan for the Digitization of Cultural Heritage* (hereafter: the Plan), focusing on its policy background, strategic framework, and implications for archives, libraries, and museums. It situates the Plan within its broader historical and institutional context, analyzing its main pillars, implementation mechanisms, and technological infrastructure. The discussion highlights both the opportunities and challenges the Plan presents for cultural institutions, showing how it embodies a dual commitment to preserving Italy's past while fostering innovation, accessibility, and sustainability. The conclusion reflects on the wider significance of the Plan for Italy and Europe, underscoring its potential to harmonize tradition and progress in the digital age.

2 POLICY AND HISTORICAL CONTEXT

Digitization projects in Italy have traditionally been fragmented[2]. Since the 1990s, archives, libraries, and museums have carried out a range of initiatives, often supported by regional governments, foundations, or European funds (Ross, 2000). While many of these projects produced valuable digital collections, the absence of a unified strategy meant that results were scattered, heterogeneous, and difficult to integrate. Early initiatives such as *Internet Culturale* (2005) and *CulturaItalia* (2008) attempted to centralize access to cultural resources, but they lacked the systematic governance and sustainable funding required for large-scale impact. Moreover, standards for metadata, interoperability, and preservation were inconsistently applied, leading to significant disparities among institutions and regions.

The Plan did not develop in isolation but rather within a broader European and international context. It is closely aligned with key European policy frameworks that have shaped the digital transformation of culture over the past two decades. Among these, the Digital Agenda for Europe (European Commission, 2010) played a pivotal role by emphasizing the importance of digital cultural resources as engines of the knowledge economy. Likewise, the Europeana initiative, launched in 2008, has been fundamental in bringing together digital heritage content from across Europe, establishing shared benchmarks for metadata standards, interoperability, and access (Europeana Foundation, 2020). More recently, the European Strategy for Data and the European Commission's vision for a common European data space for cultural heritage (European Commission, 2022) have further reinforced this framework, promoting a more integrated and open approach to the management and reuse of cultural data. At the international level, the Italian Plan also draws on a series of European Commission Recommendations (European Commission, 2011, 2021a, 2021b, 2022) as well as on a series of international guidelines (UNESCO, 2003; etc.) which have influenced national strategies on digital preservation and access. These frameworks highlight the need to protect

2 The context of cultural institutions in Italy is broad and complex, both in terms of quantity and in terms of diversity of mission and organization. Cross-referencing data from Istat (Italian National Institute for Statistics) with data from various Ministry databases, there are over 27,700 public and private cultural sites, in addition to approximately 1,000 institutions active in the performing arts. This is an approximate but realistic snapshot, which shows the following breakdown: more than 6,200 museums, monuments, and archaeological sites; over 9,500 archives; almost 12,000 libraries; and around 1,000 performing arts organizations. Within this landscape, the Ministry of Culture alone has 770 institutions dedicated to the protection and conservation of cultural heritage (Italian Ministry of Culture, 2022).

cultural diversity and to safeguard digital heritage as a public good, ensuring that access to knowledge remains inclusive and sustainable across generations.

3 THE NATIONAL PLAN FOR THE DIGITIZATION OF CULTURAL HERITAGE

The *National Plan for the Digitization of Cultural Heritage* (see Figure 1) outlines the strategic vision through which the Italian Ministry of Culture, in coordination with the Regions, promotes and manages the process of digital transformation across the cultural sector during the five-year period 2022–2026. It was published in June 2022 by the *Central Institute for the Digitization of Cultural Heritage – Digital Library* of the *Ministry of Culture* and aims to consolidate the digital ecosystem in the cultural sphere to make it accessible to all categories of users and to create user-oriented services and applications. This Plan creates the strategic context for the implementation of the objectives of the National Recovery and Resilience Plan (NRRP)[3], thus constituting a methodological and operational reference for archives, libraries, museums and public cultural sites that preserve, manage, and enhance cultural heritage. As such, the Plan also serves as a strategic, intellectual, and technical reference point for achieving the objectives set out in the NRRP. The Plan was developed through a participatory process that engaged numerous cultural institutions and professionals who contributed via public consultation sessions. Consequently, the Plan stands as a key methodological and operational guide for all institutions and professionals - both public and private—who, in their work, share and uphold the values expressed within this framework.

The *National Plan for the Digitization of Cultural Heritage* outlines three principal and interrelated goals that guide its strategy for the digitization of cultural heritage. These objectives aim to expand access, drive a broader digital transformation, and foster an interconnected ecosystem among cultural institutions.

The first objective concerns the broadening of access to cultural heritage. The Plan emphasizes that accessibility is not merely a technical matter of placing

3 The National Recovery and Resilience Plan (NRRP) (in Italian: Piano Nazionale di Ripresa e Resilienza, PNRR), is Italy's response to the COVID-19 pandemic, implemented through the European Union's Next Generation EU program. It is a set of reforms and investments totalling over € 222 billion, funded by € 191.5 billion in EU funds and € 30.6 billion from the Italian state, to promote green, digital, and inclusive growth. The plan is structured into six main „missions" focusing on areas like digitization, ecological transition, sustainable infrastructure, education and research, inclusion and cohesion, and health.

content online, but a cultural and social commitment to ensuring that digital heritage is available, usable, and meaningful to diverse audiences. In this view, digitization becomes a means to promote inclusion, participation, and knowledge sharing among citizens, students, researchers, and cultural practitioners. Access must therefore be both quantitative—expanding the amount of cultural material available online—and qualitative, enhancing the ways in which people can explore, interpret, and reuse digital resources. The Plan explicitly acknowledges the need to remove linguistic, sensory, and cognitive barriers, and to design digital environments that are intuitive and inclusive. This approach aligns with principles of universal and participatory design, encouraging institutions to co-create digital services with their users and to foster new forms of engagement that extend beyond the walls of museums, libraries, and archives.

Figure 1: The cover of the National Plan for the Digitization of Cultural Heritage

Figure 2: The cover of The Guidelines for the digitization of cultural heritage

The second objective reframes digitization as a driver of systemic transformation within cultural institutions. Rather than viewing it as a purely technical process of converting analogue artefacts into digital formats, the Plan positions

digitization as a catalyst for rethinking institutional structures, workflows, and relationships with the public. In this perspective, the digital shift requires reorganization at multiple levels: the management of collections, the design of user services, and the overall governance of cultural data. Institutions are called to assess their level of digital maturity, identify gaps, and adopt strategies that strengthen their capacity to operate effectively in a networked environment. This transformation also involves reimagining how cultural institutions communicate, collaborate, and deliver value in a digital society—shifting from the logic of custodianship to that of active mediation and co-creation. The Plan thus promotes a holistic vision of digitization as a process that reshapes not only technologies and infrastructures but also professional cultures, competencies, and institutional identities.

The third objective focuses on the creation of interconnected ecosystems of cultural data and services. The Plan recognizes that Italy's cultural heritage landscape has long been characterized by fragmentation, with many institutions working independently and often duplicating efforts. To overcome this, the Plan advocates for a distributed, collaborative model in which institutions share infrastructures, standards, and best practices. Central to this goal is the principle of interoperability: cultural data should not remain confined within individual databases or platforms but should circulate freely across institutions, regions, and disciplinary domains. By fostering such connections, the Plan envisions a federated network of digital heritage that amplifies collective value, encourages innovation, and ensures long-term sustainability. This ecosystem approach also supports efficiency, reducing redundancy and promoting shared learning, while reinforcing Italy's contribution to broader European initiatives such as Europeana and the emerging European data space for cultural heritage.

Underlying all three objectives is a commitment to continuous improvement and collaboration. The Plan is conceived as an evolving framework rather than a fixed program: it requires ongoing dialogue among institutions, professionals, and policymakers to adapt to technological innovation and shifting cultural needs. Its success depends on cultivating a shared culture of digital responsibility—one that balances openness with preservation, accessibility with ethical stewardship, and national priorities with international cooperation.

In sum, the Plan seeks to transform digitization from a fragmented set of technical activities into a coherent national strategy that integrates cultural policy, technological innovation, and institutional reform. By expanding access, fostering systemic change, and building interconnected ecosystems, it positions digital heritage as a public resource that both safeguards the past and enables new forms of creativity, participation, and knowledge for the future.

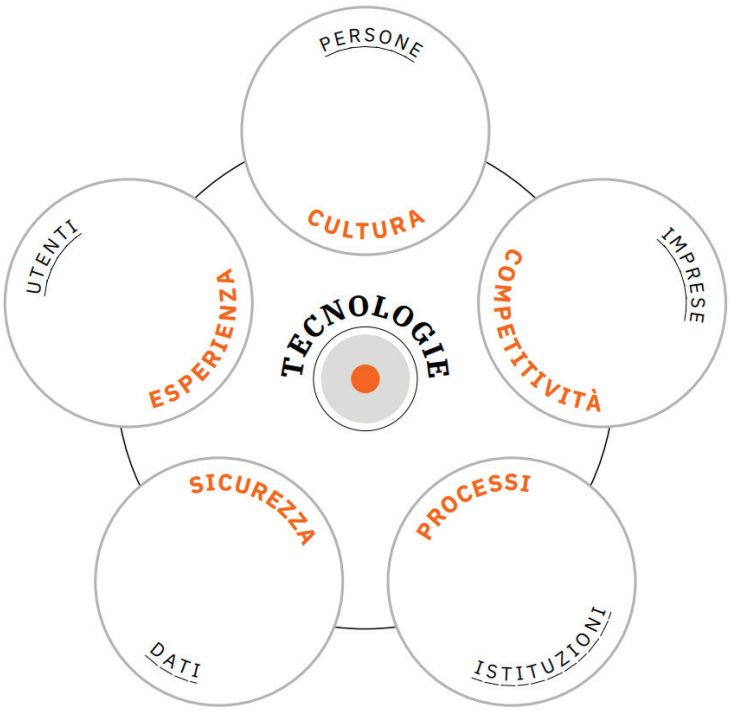

Figure 3: Contexts enabled by technologies (National Plan for the Digitization of Cultural Heritage, 35)

The "2022-2026 Strategy" chapter of the Plan proposes a coherent and ambitious roadmap to transform Italy's cultural institutions through digital innovation. Recognizing that the mere digitization of artefacts is insufficient, the strategy outlines how enabling technologies, revised institutional processes, and enhanced human capital can together foster a sustainable digital ecosystem. The aim is to harmonize efforts across national and local levels, leveraging the investment and momentum provided by the National Recovery and Resilience Plan (NRRP) to effect structural change throughout the GLAM (Galleries, Libraries, Archives, Museums) sector.

At its core, the strategy identifies that achieving the Plan's objectives requires more than isolated digitization initiatives: it demands a systemic approach grounded in shared infrastructure, interoperable standards, and a digital culture that permeates institutional practices. The strategy is linked closely to the NRRP, positioning the digitization of cultural heritage as both a national priority and a contribution to European-level objectives, such as the creation of a common European data space for cultural heritage and participation in collaborative cloud architectures (European Commission, 2021). By embedding cultural digitization within broader reforms, the strategy aims to accelerate the transition to an integrated, user-focused, and resilient digital ecosystem.

To operationalize this transformation, the strategy is structured around three strategic pillars: enabling technologies, institutional processes, and people. These pillars are conceived not as separate silos but as mutually reinforcing dimensions: infrastructure supports process innovation, which in turn depends on trained and engaged personnel to deliver new services and user experiences.

Enabling technologies form the foundational layer of the strategy (see Figure 3). The Plan articulates a vision for a national data infrastructure dedicated to cultural heritage, designed to support preservation, interoperability, public access, and cross-domain integration. Central to this vision is the creation of a "software infrastructure for cultural heritage data" (sub-investment M1C3 1.1.4 under the NRRP), conceived as a cloud-native platform that aggregates, manages, preserves, and exposes metadata and digital resources. This infrastructure aims to allow cultural institutions — both public and private — to retain ownership of their data while leveraging shared services for storage, processing, interoperability, and secure access. Importantly, the infrastructure is designed to support different integration models: a fully integrated model (where resources and digital lifecycle are hosted within the national infrastructure) and a federated model (where data remain on institutional systems but are accessible via standard APIs). Through these approaches, the strategy anticipates reducing inefficiencies, minimizing vendor lock-in, and enabling scalable, cross-institutional reuse of data. The infrastructure also follows international best practices (such as the OAIS ISO standard) to ensure long-term preservation and proper contextual management of data, including integration with national conservation systems and digital archives.

Complementing the infrastructure, the strategy also envisions the introduction of a digital identity certification system for cultural assets (sub-investment M1C3 1.1.2). Recognizing that many existing institutional systems use proprietary or fragmented identifiers, the Plan proposes a unified certification mechanism capable of linking digital representations with their physical counterparts, administrative procedures, and legal metadata. This system is expected to facilitate not only interoperability across institutions but also digital administrative workflows, secure provenance tracking, and potentially, in the future, the use of smart contracts in cultural heritage management.

Finally, the technological pillar includes support for user-centered design and innovation. The strategy embraces advanced technologies such as artificial intelligence, immersive visualization (e.g., virtual or augmented reality), big data analytics, and interactive design to enhance how users experience cultural heritage, and to support new models of access, interpretation, and reuse. By financing a "Digital Services Platform for developers and enterprises" (sub-investment M1C3 1.1.12), the Plan aims to stimulate public-private collaboration, support start-ups, and foster the development of high-value applications that leverage open APIs, scalable architectures, and interoperable standards. This platform is expected to contribute to the growth of a dynamic market for cultural digital services, driven by both institutional and entrepreneurial actors.

In parallel with technological transformation, the processes of cultural institutions must be rethought and optimized. The Plan strategy underscores the importance of considering the full lifecycle of digital resources, from acquisition to preservation, dissemination, and reuse. Institutions are encouraged to adopt unified, domain-aware workflows that ensure digital resources are managed systematically and sustainably. This encompasses not only technical aspects but also governance, metadata standards, and service architectures aligned with national and European policies.

Access and reuse policies are another central element of the process domain. The strategy seeks to promote open, standardized frameworks for data circulation, enabling interoperability with institutional, national, and international platforms. By integrating access and reuse considerations into the design of digital services, the Plan aims to facilitate the creation of value-added applications, scholarly tools, and cultural experiences beyond the institution itself.

Designing services and value models is the third process dimension. The strategy frames cultural institutions as active mediators, not just custodians, of heritage. It encourages the development of new paradigms for public engagement, such as participatory experiences, educational tools, and creative reuse, grounded in digital platforms. This shift demands a rethink of institutional roles, governance, and service strategies, aligning them more closely with user needs, cross-domain cooperation, and sustainable value creation.

The third major pillar of the Strategy focuses on people—an acknowledgement that technology and policy alone cannot drive transformation without a corresponding investment in human capital and social engagement. The Plan emphasizes that digital transformation should place cultural professionals and users at the center. For institutions to adapt, they must overcome internal skills gaps, strengthen organizational capacity, and support continuous professional development. A key initiative in this regard is the planned "Training and Skills Growth" programme (sub-investment M1C3 1.1.6, 2023-2026), designed to promote lifelong learning, change management, and methodological renewal across institutions. This is not limited to technical training, but extends to organizational, managerial, and strategic competencies needed to navigate digital change effectively.

Equally important is the strategy's emphasis on transforming public interaction with cultural heritage. Moving beyond passive consumption, the Plan encourages institutions to adopt dissemination and social sharing practices that foster active engagement, community building, and inclusive cultural participation. The Plan also champions co-creation and crowdsourcing as means to expand interpretive voices, spark innovation, and deepen connections between diverse publics and cultural institutions. By enabling citizens, creative professionals, and communities to contribute to the digital heritage ecosystem, the strategy envisions a dynamic, participatory model of cultural production, reinterpretation, and use.

Overall, the "2022-2026 Strategy"offers a coherent framework for Italy's digital transformation in the cultural sector. It emphasizes that sustainable digitization requires more than technical infrastructure: it demands integrated processes, empowered people, and an ecosystem that values interoperability, openness, and

collaboration. Through coordinated investment and strategic direction, the Plan aims to foster a resilient digital cultural infrastructure capable of evolving with technological, social, and institutional change.

Regarding funding, the Plan leverages resources from the NRRP and other European structural funds. It prioritizes large-scale digitization campaigns for priority collections, particularly those at risk of deterioration. Funding is also directed to regional projects that align with national standards, ensuring both diversity and coherence. The Plan includes mechanisms for monitoring progress and evaluating impact. Metrics include the number of digitized objects, the level of interoperability achieved, the degree of access and reuse, and the long-term sustainability of infrastructures

4 THE TECHNICAL-OPERATIONAL GUIDELINES

The Plan includes a section dedicated to five guidelines, which provide guidance for the design and implementation of digitization processes (see Figure 4) and suggest methodologies and procedures to implement the processes identified in the Strategy section. These guidelines are not prescriptive; they provide a technical and methodological framework with a relevant bibliography as an aid for planning and implementing activities related to the digitalisation of cultural heritage. Each document treats a different aspect of digitalisation practices. They will be updated as technology progresses and as norms, methods and standards develop. The guidelines are directed to personnel of cultural institutes who are involved in processes of the digital transformation of cultural heritage in various capacities. The five guidelines are:

1. *Guidelines for the digitization of cultural heritage* (in Italian: *Linee guida per la digitalizzazione del patrimonio culturale*): they establish methodological standards, quality parameters, levels of detail, and criteria for digital acquisition processes involving images, 3D models, and reproductions.
2. *Guidelines for drafting the Data Management* Plan (in Italian: *Linee guida per la redazione del piano di gestione dei dati*): they set out policies concerning metadata, data quality, long-term preservation, and dataset sustainability.
3. *Guidelines for the acquisition, circulation, and reuse of digital reproductions* (in Italian: *Linee guida per l'acquisizione, la circolazione e il riuso delle riproduzi-*

oni dei beni culturali in ambiente digitale): they address contractual frameworks, licensing schemes, terms of use, access procedures, and data interoperability.

4. *Guidelines for the classification of digital products and services, processes, and management models* (in Italian: *Linee guida per la classificazione di prodotti e servizi digitali, processi e modelli di gestione*): they outline categories, maturity levels, evaluation criteria, and governance models.
5. *Methodology for assessing the digital maturity of cultural institutions* (in Italian: *Introduzione alla metodologia per la valutazione della maturità digitale degli istituti culturali*): they provide criteria and indicators for measuring the current state of digitization, identifying strengths and weaknesses, and defining areas for improvement.

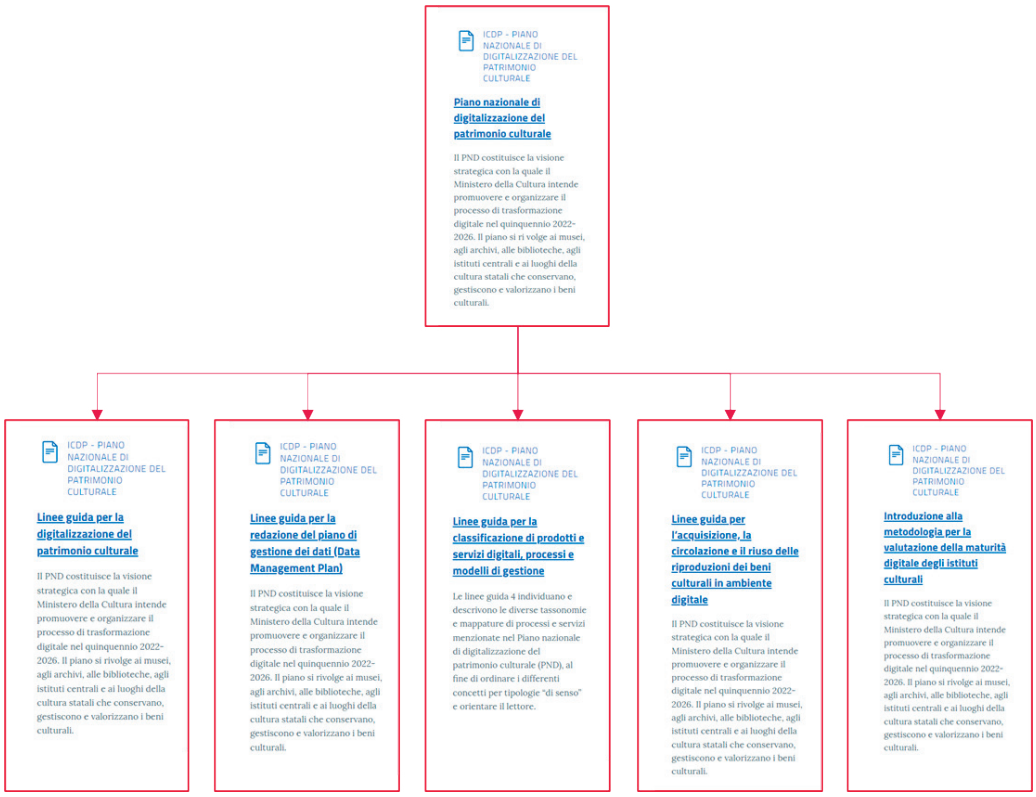

Figure 4: The five guidelines accompanying the National Digitization Plan

The objective of these Guidelines is to define approaches and procedures for the creation, metadata processing and archiving of digital objects of the analogue cultural heritage. They offer procedural schemes and operational models useful

for configuring a digitalisation project with quality data which are in line with the most up-to-date national and international standards, such that their interoperability and preservation can be guaranteed over time. In the following, we will focus in particular on the Guidelines for the digitization of cultural heritage.

5 THE GUIDELINES FOR THE DIGITIZATION OF CULTURAL HERITAGE

The *Guidelines for the digitization of cultural heritage* (in Italian: *Linee guida per la digitalizzazione del patrimonio culturale*, see Figure 2) (hereafter "the Guidelines") constitute a technical-operational annex to Italy's *National Plan for the Digitization of Cultural Heritage*, offering a methodological and procedural reference for the creation, metadata enrichment, and archiving of digital surrogates of analogue cultural heritage (Ministero della Cultura, 2022)[4]. Their nature is informative and guiding rather than strictly prescriptive, aimed at supporting the staff of cultural institutions in planning, executing, and validating digitization projects in coherence with the broader Plan vision. The Guidelines do not exhaustively cover every conceivable type of object or scenario but provide paradigms, models, and operational frameworks aligned with evolving standards and practices.

Their structure comprises twelve main sections covering: (1) introductory framework, (2) project phases, (3) digital formats, (4) metadata, (5) intellectual property rights, (6) naming conventions, (7) cost estimation, (8) technical specifications, (9) verification and testing, (10) storage and data supports, (11) bibliography, and (12) appendices.

The document addresses critical phases including motivations, actor roles, operational modes, selection criteria, timing, file formats, metadata, naming conventions, cost items, testing, and storage. It is meant to be complemented by other

4 The Italian guidelines on digitisation have counterparts in other countries; among others, the following guidelines are worth mentioning: UK National Archives, Digitisation at The National Archives, 2016, <https://cdn.nationalarchives.gov.uk/documents/information-management/digitisation-at-the-national-archives.pdf>; FADGI (Federal Agencies Digital Guidelines Initiative), <http://www.digitizationguidelines.gov>, in particolare: Technical Guidelines for Digitizing Cultural Heritage Materials Creation of Raster Image Files, 2016; METAMORFOZE, Netherlands' national programme for the preservation of paper heritage, Metamorfoze Preservation Imaging Guidelines, <https://www.metamorfoze.nl/sites/default/files/documents/Metamorfoze_Preservation_Imaging_Guidelines_1.0.pdf>; National Archives of Australia, Guidelines for handling, preparing and digitising archival paper and printed materials, 2022, <https://www.naa.gov.au/guidelines-handling-preparing-and-digitising-archival-paper-and-printed-materials>; ISO/TR 13028:2010, Information and documentation - Implementation guidelines for digitization of records; U.S. National Archives and Records Administration (NARA)NARA, Technical Guidelines for Digitizing Archival Materials for Electronic Access: Creation of Production Master Files – Raster Images, 2004, <https://www.archives.gov/files/preservation/technical/guidelines.pdf>; IFLA, Guidelines for digitization projects for collections and holdings in the public domain, particularly those held by libraries and archives, 2008, <https://www.ifla.org/files/assets/preservation-and-conservation/publications/digitization-projects-guidelines.pdf>.

technical annexes dealing with data management plans, reuse, classification, and digital maturity. Periodic revisions are foreseen to keep the guidelines aligned to technological, normative, and methodological developments.

The Guidelines stress that any digitization project should begin from clearly defined goals and rationales. These may include using reliable digital surrogates to prevent excessive handling of originals (*Conservation*); enabling broader public and scholarly use (*Access and dissemination*); supporting analysis, monitoring, non-invasive investigations (*Scientific study and diagnostics*); harmonizing earlier digital outputs to current standards (*Updating legacy digitizations*). Projects should be modular and scalable, capable of adapting to institutional constraints, resource availability, and evolving goals.

The Guidelines emphasize several key elements to consider when initiating a digitization project - namely, *why* to digitize, *what* is to be digitized, *who* is responsible, *how* the process will be carried out, *when* it will take place, and *where* it will be performed.

The objectives of digitization (*Why*) are manifold and reflect the complex mission of cultural institutions today. At its core, digitization is a tool for conservation and risk mitigation, creating accurate digital surrogates that reduce the need to handle fragile originals and thus help safeguard them for the future. It also plays a crucial role in access and dissemination, opening up collections to a far broader audience of researchers, students, and the general public, who can explore cultural heritage remotely and in new ways. Beyond preservation and access, digitization supports study and diagnostics, enabling non-invasive scientific analyses that deepen our understanding of cultural artefacts. Finally, it allows for the integration and upgrading of legacy projects, bringing earlier digitization efforts up to contemporary technical and quality standards. Taken together, these aims embody the dual mission of cultural institutions: to preserve their heritage and to make it meaningfully accessible to society.

About the selection and object typologies (*What*), the Guidelines recommend selecting objects based on cultural relevance, physical condition, potential reuse, and institutional priorities. The nature of the object (documents, photographic materials, three-dimensional artifacts, audiovisual objects) dictates the technical path to adopt. The digital representation methods covered include 2D scanning/photography, 3D modelling and scanning, and audio/video capture.

Regarding roles, teams, and responsibilities (*Who*), the Guidelines emphasize that a clear organizational structure is central to success. The Guidelines identify a project team composed of a project owner (typically the institution), a project manager, domain experts (archivists, curators, restorers), digital technicians, and IT staff. Collaboration with external contractors or partners is possible, provided that interoperability and quality control mechanisms are respected roles ensures accountability, interoperability of tasks, and alignment with institutional missions.

About the methodologies and process control (*How*), the Guidelines point out that each typology (2D, 3D, audiovisual) requires specific acquisition protocols, and the Guidelines emphasize traceability of acquisition steps and conditions; accurate recording of environmental parameters (e.g., lighting, geometry, calibration); rigorous quality control and validation at each stage; versioning and preservation of intermediate files; documentation of all processing steps to ensure reproducibility.

This approach aligns digitization with principles of scientific rigor and long-term reliability.

Finally, with reference to timing and operational settings (*When and Where*), according to the Guidelines, digitization should be embedded within the object's lifecycle (e.g., in conjunction with conservation or cataloguing phases). Depending on constraints, work may occur *in situ* (within institutional premises) or in specialized labs. Logistics, environmental control, handling, and data security must be carefully planned.

The Guidelines also provide several technical details. For example, regarding the choice of file formats, they recommend the use of open, standardized, and non-lossy formats to ensure long-term preservation and interoperability. For instance, they suggest employing RAW, uncompressed TIFF, or DNG (open RAW) formats for image master files, while reserving compressed formats such as JPEG or MPEG for derivative copies and dissemination purposes. For audio materials, WAV or Broadcast WAV formats are advised for master files, whereas for video, AVI—or other formats endorsed by AGID—are recommended for preservation masters. When dealing with legacy digitization projects, the Guidelines emphasize migrating data to formats that minimize information loss and maximize interoperability.

The Guidelines classify metadata into five main categories: descriptive metadata, which encompass cataloguing information, contextual elements, and content

description; technical metadata, including details about the capture device, resolution, and compression parameters; structural metadata, which document the relationships among files and different versions; preservation metadata, focused on provenance, fixity, authenticity, and checksums; and rights metadata, concerning licensing conditions, access permissions, and copyright status. To ensure interoperability among institutional systems and with the National Digital Library, the Guidelines recommend adopting the METS (Metadata Encoding and Transmission Standard) schema (Library of Congress, 2010) to integrate these different metadata layers. In practice, implementation generally relies on customized software modules, often developed or supplied by digitization service providers.

Unique, systematic, scalable filenames are essential. The Guidelines propose structured identifiers that integrate institutional IDs, catalogue references, chronology, and versioning. Such conventions help avoid ambiguity and facilitate automated processing at scale.

In the section devoted to costs, testing, storage, and quality assurance, the Guidelines propose a structured and transparent approach to planning and managing the economic and technical dimensions of digitization projects. They recommend that every initiative be supported by a detailed budget covering all relevant cost categories, from human resources to technical and operational expenditures. Personnel costs include the work of project managers, conservators, technical operators, metadata specialists, and IT staff, whose coordinated effort ensures the coherence and quality of the entire process. Equipment and tools - such as scanners, cameras, workstations, converters, and consumables - constitute another fundamental budgetary component, as do logistical expenses related to the transport, handling, and conditioning of original materials. Additional items include support materials used for packaging and protection, as well as the costs of testing, validation, and quality control. The Guidelines also highlight the importance of accounting for software licenses, external services, and other commissioning costs. By presenting an indicative cost framework, the document encourages institutions to design transparent, comparable, and economically sustainable digitization projects.

Equally important is the definition of verification and quality control procedures. Each project should establish clear acceptance criteria, intermediate checkpoints, and final validation steps. The Guidelines advocate a progressive control meth-

odology, beginning with limited sample testing to identify potential issues, and then extending verification to the entire dataset. This phased approach allows institutions to ensure that both technical and documentary parameters are met before large-scale data dissemination or preservation.

The section on *storage* and data supports underscores the centrality of secure, redundant, and environmentally controlled data management practices. The Guidelines recommend implementing multiple backup strategies and maintaining careful oversight of physical media such as disks or magnetic tapes. Regular monitoring of storage conditions and periodic media refresh cycles are considered essential to safeguard the long-term integrity and accessibility of digital assets.

Finally, the Guidelines conclude with an acknowledgement of their own current limitations and a forward-looking perspective on future developments. They recognize that the present version does not fully address the complexity of certain domains—such as diagnostics-driven digitization, comprehensive data management planning, or the regulation of access and reuse models. These aspects are to be developed in complementary annexes or future revisions. The forthcoming updates are expected to expand the scope of the document by including techniques for recovering legacy or "orphan" digitizations, a classification of the professional competencies required for projects of different scales, and detailed workflow examples derived from national pilot experiences. Further enhancements will also concern audiovisual digitization, the integration of georeferencing processes, and the incorporation of GIS-related metadata.

Taken together, these sections articulate a coherent vision of digitization as a multidisciplinary and iterative process—one that must balance methodological rigor, financial accountability, and technological sustainability in order to ensure the effective and lasting preservation of Italy's cultural heritage in digital form.

In sum, the Guidelines establish a comprehensive framework that brings together technical standards, project management practices, and strategic principles for the digitization of Italy's analogue cultural heritage. Emphasizing interoperability, documentation, and sustainability, they define digitization as an integrated and cyclical process rather than a one-time technical operation. The Guidelines provide clear procedural models and operational schemes to help institutions design and implement digitization projects that produce high-quality, interoperable data, ful-

ly aligned with the latest national and international standards to ensure long-term preservation. They also offer a coherent, multi-layered methodological approach that enables Italian cultural institutions to undertake digitization in a consistent, quality-driven manner. Through structured processes, rigorous metadata practices, standardized naming conventions, transparent costing, and robust quality assurance measures, the Guidelines align local initiatives with broader best practices. Their ongoing updates further guarantee flexibility and responsiveness to technological advancements and the evolving needs of the cultural sector.

6 IMPLICATIONS FOR CULTURAL INSTITUTIONS

The *National Plan for the Digitization of Cultural Heritage* offers unprecedented opportunities for the cultural sector, expanding the reach and impact of Italian heritage in ways that were previously unimaginable. By facilitating broader access for citizens, students, and researchers, the Plan helps democratize knowledge and encourages more active engagement with cultural resources. It also enhances the global visibility of Italy's vast and diverse heritage, positioning it more prominently within international digital platforms and networks. Moreover, the Plan opens new avenues for creative reuse, supporting innovation within the cultural and creative industries and fostering fresh interpretations of cultural content.

Yet these opportunities are accompanied by equally significant challenges. One of the most pressing is the need to ensure long-term digital preservation, particularly in light of rapid technological obsolescence and evolving standards (CCSDS, 2025). Another is the delicate task of balancing openness with respect for intellectual property rights and ethical considerations, as emphasized by UNESCO (UNESCO, 2003). Finally, the Plan must address the disparities among institutions, recognizing that not all possess the same technical capacities or financial resources to implement digitization at scale (Tammaro, 2022). Together, these opportunities and challenges define the complex landscape in which the Plan seeks to operate—one that requires both strategic vision and sustained collaboration across the cultural heritage community.

The Plan carries significant implications for the entire GLAM sector, and its impact on archives is particularly transformative. It encourages the systematic digitization of finding aids, registers, and documentary collections, advancing both

preservation and public accessibility. By emphasizing the use of standards such as EAD and promoting interoperability with national and international archival networks, the Plan reinforces the central role of archives within the broader digital ecosystem. At the same time, it must contend with persistent challenges, including the management of privacy and intellectual property rights, as well as the technical and logistical complexities involved in digitizing fragile materials and large-scale documentary series.

Libraries have long been engaged in digitization, but the Plan provides a stronger framework for coordination. It enhances the visibility of Italian digital collections within Europeana and promotes the reuse of digital resources for research and education (Ross, 2000). Particular attention is given to rare and ancient books, as well as audiovisual materials. Libraries also play a crucial role in promoting open access and digital literacy (IFLA, 2008).

Museums benefit from the Plan through large-scale digitization of artworks, 3D modeling of monuments, and digital storytelling initiatives. The Plan supports virtual exhibitions and immersive experiences, which can broaden access to collections while also stimulating tourism and creative industries. The challenge lies in balancing authenticity, conservation needs, and the use of advanced digital technologies.

In 2022, the Central Institute for the Digitization of Cultural Heritage – Digital Library of the Ministry of Culture launched four major digitization initiatives funded by the NRRP:

1) A € 9.2 million tender procedure for the award of services for the digitization of microfilms of manuscripts from the National Center for the Study of Manuscripts (in Italian: Centro Nazionale per lo Studio del Manoscritto, CNSM) preserved at the National Central Library in Rome. This is the largest collection of microfilms of manuscripts in Italy, consisting of over 107,000 individual microfilms made in the second half of the last century. The microfilms reproduce over 110,000 manuscripts, the originals of which are preserved in over 180 libraries throughout Italy, as well as in 16 foreign libraries. Overall, the microfilm collection of the National Center for the Study of Manuscripts consists of approximately 23 million individual frames that will be converted into digital resources, for a total of 46 million digitized pages. The project is one of the most significant initiatives ever undertaken in the field of manuscripts, aimed at making the heritage of Italian

libraries accessible and usable to all through digital reproductions. The deadline for the procedure was set for September 20, 2022.

2) A € 27.9 million tender procedure for the category "Paper: cadastral documentation (registers and maps) and post-unification daily newspapers". This procedure has two main areas of investment. The first, aimed at archives, concerns the digitization of the cadastral archives of the State Archives of 19 regional capitals throughout Italy. The project will produce 21 million new digitizations of archival documents. These include registers, inventories, loose papers, and cadastral maps, whose digitization will allow for easier access through dedicated portals. This project will make an essential resource for learning about the history of the territory and, consequently, the communities that live there, available for online consultation, demonstrating once again how central the role of archives and the documentation they preserve and make available is. The second project, aimed at libraries, involves the digitization of a large number of post-unification daily newspapers, published in various Italian cities between 1861 and 1955, and now preserved in the important collections of the Central National Libraries of Florence and Rome and the National Libraries of Milan and Naples. More than 12 million pages of newspapers will be acquired in this way, representing a considerable increase in the national digital collections. The project is one of the most significant initiatives ever undertaken in Italy and Europe to make library and archival heritage available to all through high-quality digital reproductions. Overall, the digitization of the 'paper' category will produce 33 million new digital resources, each accompanied by its own descriptive metadata that will enable it to be found within the National Digital Library, a long-term development objective within the NRRP. The deadline for submitting bids was set for November 7, 2022.

3) A € 16.9 million tender procedure for the digitization of the photographic archives of the Superintendence of Archaeology, Fine Arts, and Landscape (ABAP). The digitization procedures are aimed at the mass acquisition, using scanners and cameras, of photographic prints, slides, negatives on film and glass plates, and unique items, including antique ones (e.g., daguerreotypes). Other collections outside the Superintendence will also be digitized, such as the National Aerial Photo Library and some photographic collections of the ICCD (Central Institute for Cataloguing and Documentation). In addition, other photographic collections

held at selected museums throughout the country will also be digitized. The digitization project will involve over 5.5 million photographs which, together with approximately 500,000 drawings, will produce 6 million new digital resources, each accompanied by its own descriptive metadata that will enable it to be found within the national digital library, a long-term development objective within the NRRP. The project is one of the most significant initiatives ever undertaken in Italy and Europe to make the national photographic heritage available to everyone. The deadline for the procedure was set for November 14, 2022.

4) A € 18.6 million tender procedure for the digitization of material stored in museum depots, with the aim of protecting, preserving, enhancing, and promoting the numerous works stored there. Archaeological and art museums preserve a quantitatively greater heritage than that on display, which is little known to both specialists and the general public. The project involves the digitization of over 600,000 objects, including archaeological finds, works of art, drawings, and prints. It is estimated that over 2 million new digital resources will be produced. Each will be accompanied by metadata, which will enable it to be found within the national digital library, a long-term development objective within the NRRP. This is a large-scale operation that will involve over 70 museums and archaeological sites throughout Italy, with an emphasis on the South, which will receive 40% of the total investment. Another strand of the investment, which is economically secondary but no less culturally significant, is aimed at the digitization of graphic works (i.e., drawings, prints, sketches, engraved matrices, and various other items) preserved in the institutes affiliated with the General Directorate of Museums: among these, the collections of the Drawings and Prints Rooms of the Uffizi Galleries and the Museum and Royal Forest of Capodimonte stand out. The deadline for submitting bids was set for December 5, 2022.

In 2023, other calls for tenders were published also for regional digitization projects under the responsibility of the Italian Regions. These initiatives, structured in regional lots linked to the NRRP investment M1C3 (Digital Strategies and Platforms for Cultural Heritage), aim to carry out digitization work across the country. The Italian National Plan for the Digitization of Cultural Heritage serves as the technical and methodological framework for these calls. Regional authorities — sometimes supported by national implementing bodies such as Invitalia — are responsible for

issuing tenders covering the digitization of paper materials, photographic archives, museum objects, and library collections. The regional projects generally focus on acquisition activities (scanning, 3D, and photogrammetry), metadata creation according to national standards, as well as digital access and preservation interventions.

Both national and regional digitization projects are currently underway and are expected to be completed by mid-2026, resulting in the production of over 65 million digital objects that will be made available on a platform called *Infrastructure for Cultural Heritage* (in Italian: Infrastruttura per il Patrimonio Culturale, I.Pa.C)[5].

7 CONCLUSIONS

Preserving the past, embracing the future: the Italian *National Plan for the Digitization of Cultural Heritage* marks a milestone in the nation's cultural policy. It recognizes the pivotal role of digital technologies in safeguarding fragile heritage while promoting openness, accessibility, and innovation. By embedding Italy's initiatives within the broader European and international framework, the Plan reinforces the country's position in the global digital heritage ecosystem.

More than a technical roadmap, it embodies a cultural vision that redefines the relationship between institutions, professionals, and the public. It transforms digitization from a collection of isolated projects into a coherent, systemic strategy capable of bridging past and future, tradition and innovation. Its long-term success, however, will depend on sustained investment, effective governance, and the capacity to adapt to emerging challenges such as artificial intelligence and new models of digital engagement.

By embracing digital transformation, Italy not only ensures the preservation of its extraordinary cultural legacy but also contributes to the construction of a shared European and global cultural space -open, inclusive, and sustainable. Beyond its regulatory dimension, the Plan promotes a culture of digital responsibility, collaboration, and knowledge exchange among institutions, aligning national objectives with international best practices. In doing so, it lays the foundation for a unified and forward-looking vision of digital preservation and access to cultural heritage.

5 I.PaC is the digital infrastructure that offers advanced services for the enrichment and enhancement of cultural information heritage, including through technologies based on Artificial Intelligence.The infrastructure is part of the digital transformation project promoted by the Digital Library for the Directorate-General for Digitisation and Communication of the Ministry of Culture, as part of the National Recovery and Resilience Plan (NRRP). See: https://ecomic.cultura.gov.it/ipac.

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Summary

The paper examines Italy's National Plan for the Digitization of Cultural Heritage (2022–2026), an ambitious national strategy that redefines how cultural heritage is preserved, managed, and shared in the digital age. Rooted in the broader European and international policy framework, the Plan aims to overcome decades of fragmented and locally driven initiatives by establishing a coherent, inclusive, and forward-looking approach to digitization. It transforms what was once a collection of isolated technical projects into an integrated cultural and institutional process that connects people, technology, and knowledge. At the heart of the Plan lies a commitment to accessibility and participation. Digitization is presented not simply as the conversion of analogue materials into digital files, but as a cultural act that widens access to heritage, fosters inclusion, and encourages collaboration between institutions and communities.

The Plan envisions digital heritage as a public good that should be available to everyone, regardless of geographical, linguistic, or physical barriers. In doing so, it positions cultural institutions as active mediators rather than passive custodians, inviting them to co-create new forms of cultural experience and engagement. The paper emphasizes that true digital transformation depends on more than technology alone. It requires a profound rethinking of institutional processes and professional practices. The Plan encourages museums, libraries, and archives to reorganize their workflows, adopt interoperable standards, and develop shared infrastructures capable of sustaining collaboration at national and European levels. At the same time, it underlines the essential role of people—the professionals who design and manage digitization projects, as well as

the audiences who interact with digital content. Training, capacity building, and the development of digital literacy are therefore seen as crucial components for ensuring that innovation is both effective and inclusive. A significant part of the Plan is devoted to the Guidelines for the Digitization of Cultural Heritage, which provide methodological and technical recommendations to guarantee quality, interoperability, and long-term preservation. These guidelines define standards for digital formats, metadata, and workflows, and promote transparent project management and quality control. By linking technological rigor with ethical and cultural responsibility, they help institutions produce digital resources that are sustainable, accessible, and meaningful over time.

Ultimately, the paper portrays the Plan as a cultural milestone that integrates policy, technology, and human creativity into a unified vision. It illustrates how Italy, through this initiative, seeks not only to protect its extraordinary heritage but also to project it into the future, contributing to the creation of a shared European and global digital space. In bridging preservation and innovation, the Plan reaffirms that cultural heritage, when digitally transformed with care and collaboration, can continue to inspire and connect generations.

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