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*CORRESPONDENCE

Marta Gertrudes,

✉ martamarquesgertrudes@gmail.com

Paula Ochôa,

✉ paulatelo@fcsh.unl.pt

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Integrating digital curation and digital humanities for a holistic museum impact assessment

Marta Gertrudes* and Paula Ochôa*

Faculty of Social Sciences and Humanities of NOVA University of Lisbon, Lisbon, Portugal

Museums are undergoing significant digital transformation, expanding their reach and modes of engagement. However, traditional impact assessment models for these cultural heritage institutions often fall short in capturing the full spectrum of value generated, particularly concerning digital initiatives, data preservation, and participatory practices. This study addresses this critical gap by investigating how integrating Digital Curation and Digital Humanities can reconfigure impact assessment in the museum sector. Through a qualitative, comparative analysis of established international approaches—including frameworks and standards such as the Europeana Impact Playbook, MOI! Framework, SoPHIA, ISO 16687: 2025, inDICEs, and CSIRO Impact Evaluation Guide—this paper evaluates their strengths and limitations to identify key methodological challenges. It argues that Digital Curation provides essential principles for managing the information lifecycle, while Digital Humanities offers robust methods for analysing digital engagement. The paper proposes the Impact Assessment Model with Digital Curation and Digital Humanities (IAM-CDH), a multidimensional framework integrating five core dimensions and 45 specific indicators, designed to offer a more holistic, ethical, and sustainable evaluation that reinforces museums' societal relevance in the digital age.

KEYWORDS

cultural heritage, digital curation, digital humanities, impact assessment, museums

Introduction

Driven by rapid digital transformation, a profound paradigm shift is currently reshaping the entire Galleries, Libraries, Archives, and Museums (GLAM) sector. Within this dynamic ecosystem of cultural heritage institutions, museums have transcended their traditional role as mere repositories of tangible heritage. Instead, they are evolving into proactive agents of social change, tasked with promoting education, inclusion, and active citizenship in an increasingly networked society. This evolution was formally recognised in the 2022 International Council of Museums (ICOM) museum definition, which redefined the museum's core mission as being “in the service of society” – a role fulfilled by becoming “accessible and inclusive”, fostering “diversity and sustainability” and ensuring “the participation of communities” (ICOM, 2022), marking a shift from a collection-centric focus to a user-centred, participatory model where publics are engaged as co-creators of knowledge and meaning (Nikolaou, 2024).

Conventional impact assessment models, often focused on quantifiable metrics such as visitor numbers or direct economic returns, prove insufficient to capture the complexity of the value generated by contemporary museums. They frequently overlook the impacts of digital initiatives and the long-term value of digital preservation. This gap hinders institutions from robustly demonstrating their societal relevance and securing their

legitimacy in a competitive funding landscape (Ochôa and Pinto, 2024; Uzelac and Lovrinić Higgins, 2025).

There is an urgent need for assessment frameworks that overcome traditional limitations by critically integrating the challenges posed by massive digitisation, the emergence of Artificial Intelligence (AI), the participatory paradigms of Culture 3.0, and the need for a “digital sustainability” that transcends mere preservation to encompass ethical management and equitable access (Tartari et al., 2023; Uzelac and Lovrinić Higgins, 2025).

The disciplinary contributions of Digital Curation (DC) and Digital Humanities (DH) are critically relevant here, providing the necessary tools to manage and interpret this informational value. DC provides the principles and practices for managing these digital assets throughout their lifecycle—from creation and preservation to access, use, and transformation –, ensuring their long-term integrity, authenticity, and usability (Higgins, 2018). Advanced lifecycle models, such as the d-KISTI model, emphasise the active creation of value over passive preservation (Rhee, 2024). DH, in turn, offers the methodologies and computational tools to analyse, interpret, and visualise the vast informational value unlocked by DC. Through techniques such as data mining, network analysis, and interactive platforms, DH allows for a deeper understanding of digital engagement and facilitates new, often participatory, forms of scholarly inquiry and public interaction with cultural heritage (Schreibman, 2012; Uzelac and Lovrinić Higgins, 2025).

The synergy between DC and DH provides the foundation for an impact assessment model that can adequately measure the value museums generate in the digital age, moving beyond outdated metrics to capture the impact of well-curated information and meaningful participation (Ochôa and Pinto, 2024).

This paper, therefore, addresses the central research question: What are the contributions of Digital Curation and Digital Humanities to the reconfiguration and enrichment of impact assessment models in museums? This study argues that integrating DC, focused on the entire lifecycle of digital information, and DH, with its advanced analytical and participatory methodologies, is essential for developing a more holistic and accurate evaluation framework. By critically analysing six prominent international approaches to impact assessment, this paper identifies their limitations and builds upon their strengths to propose an innovative alternative: the Impact Assessment Model with Digital Curation and Digital Humanities (IAM-CDH), a framework that integrates digital, participatory, and ethical indicators, providing a tool for the multifaceted reality of the 21st-century museum (Ochôa and Pinto, 2024; Tartari et al., 2023; Uzelac and Lovrinić Higgins, 2025).

Theoretical framework and state of the art

This transformation is underpinned by crucial theoretical shifts. Impact assessment in the cultural sector, for instance, has evolved from a narrow economic focus in the 1980s towards a multidimensional understanding of value. By the 1990s, pioneering studies catalysed a paradigm shift by demonstrating how arts and culture foster social cohesion and individual wellbeing and community empowerment, thus demanding the integration of social impact dimensions (Bollo, 2013; Matarasso, 1997). Today, a holistic approach is sought, integrating social, cultural, economic, and environmental dimensions, often framed by the Theory of Change (ToC): a methodology that maps the causal pathway from an institution’s resources and activities (inputs) to its direct, measurable results (outputs), the changes in audience behaviour or knowledge (outcomes), and the long-term societal effects (impacts) (Rogers, 2014).

Parallel to this, the very concept of sustainability has been expanded to include culture as its fourth pillar. This perspective, articulated by Hawkes (2001) and reinforced by bodies including the United Cities and Local Governments (UCLG) (UCLG Committee on Culture, 2010), argues that culture is not merely instrumental—a tool to be measured solely by its contribution to other goals (e.g., quantifiable economic metrics or visitor numbers) – but is in fact fundamental to development (Hawkes, 2001; UCLG Committee on Culture, 2010). It is the basis of values and identities that define a desirable society, one built on foundational components such as cultural vitality, diversity, and intercultural dialogue (Sabatini, 2019; Stylianou-Lambert et al., 2014).

This paradigm shift poses a significant challenge to traditional impact assessment. If culture is a foundational pillar and not just an instrument, models must evolve to measure how museums contribute to this cultural vitality itself. Conventional assessments, by focusing on instrumental socio-economic outcomes, often fail to capture this intrinsic, multifaceted cultural impact (Sabatini, 2019), creating a methodological gap. This research argues that this gap cannot be filled without first understanding the informational and digital ecosystems that modern museums now curate.

Concurrently, the museum’s role has shifted, transitioning from a passive repository into a dynamic and dialogic space for co-creation and citizen science, actively engaging communities in the interpretation and production of knowledge (Nikolaou, 2024; Robbins et al., 2021). This transformation is intrinsically linked to the final, and perhaps most critical, theoretical shift: the reconceptualisation of the museum object itself. Drawing on Buckland (1991) information typology, we can distinguish between “information-as-process” (the act of being informed), “information-as-knowledge” (the knowledge learnt) and “information-as-thing” (representing the artefacts, data and documents that convey information). Museums have always been managers of “information-as-thing” in its physical form (the artefacts). The digital transformation does not change this core mission; it merely changes the format of that “thing” into digital surrogates, datasets, and rich metadata. This perspective elevates the role of DC from a technical support task to a core institutional

Abbreviations: AI, Artificial Intelligence; API, Application Programming Interface; CSIRO, Commonwealth Scientific and Industrial Research Organisation; DC, Digital Curation; DH, Digital Humanities; EU, European Union; FAIR, Findable, Accessible, Interoperable, Reusable; GDPR, General Data Protection Regulation; GLAM, Galleries, Libraries, Archives, and Museums; IAM-CDH, Impact Assessment Model with Digital Curation and Digital Humanities; ME-MIND, Museums and Events – Measuring Impact on local eNvironment with Data analytics; OAI, Open Archival Information System; SoPHIA, Social Platform for Holistic Impact Heritage Assessment; ToC, Theory of Change; WCAG, Web Content Accessibility Guidelines.

mission essential for activating the informational potential of the collections (Latham, 2012).

This evolving context (political, practical, and theoretical) presents a significant challenge. The official European Union (EU) discourse has shifted from “preservation” and “access” to “digital transformation”, requiring a re-evaluation of how impact is measured (Uzelac and Lovrinić Higgins, 2025). This transformation is not merely rhetorical; it is a stated political priority. The EU’s Horizon Europe programme, for instance, calls for “new, participatory management models, including for museums” and investment in “high quality digitisation and curation of digital heritage assets” alongside the need for collaborative digital infrastructures for heritage, addressing the urgent demand for more digital skills in the sector, and fostering research on “the accessibility of culture and social inclusion” (European Commission, 2021; 2023). This need for collaborative infrastructures and high-quality data curation aligns directly with the development of the European Data Space for Cultural Heritage. This new infrastructure aims to “promote(s) the reuse of digitised cultural heritage among various audiences, creating value for the economy and society” (European Commission, 2022), a goal that inherently requires new, holistic models to assess its value and impact.

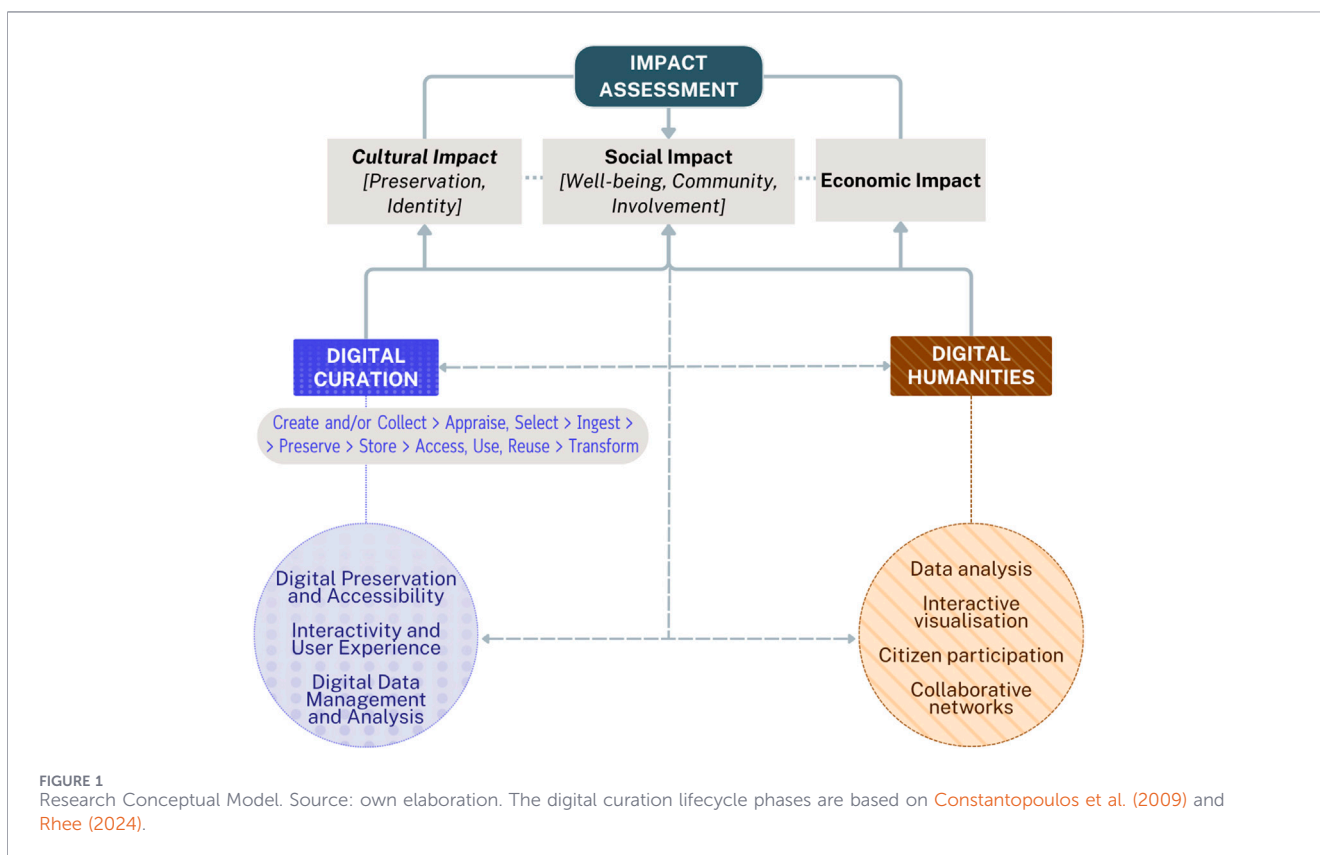
This transformation is further accelerated and complicated by the rapid integration of AI into museum practice. It is no longer a futuristic concept but a present reality, used for collection management (e.g., computational vision), metadata generation, participatory practices, and personalised visitor experiences (e.g., Natural Language Processing in chatbots) (Bernhardt and Thiel, 2022). However, this integration introduces profound epistemological and ethical challenges. Issues of

algorithmic bias, data privacy, and the “black box” nature of many AI systems raise critical questions about transparency, accountability, and the potential for digital technologies to reproduce historical inequalities (Boiano et al., 2024). A modern impact assessment model cannot ignore these dimensions. It must be equipped to evaluate not only the effectiveness of these technologies but also their ethical governance. Frameworks for responsible AI, anchored in the SAFE-D principles (Sustainability, Accountability, Fairness, Explainability, and Data Stewardship), must be incorporated into our understanding of “impact” (Murphy and Villaespesa, 2020). This need for ethical oversight is not merely technical but is a growing international policy concern, with bodies such as UNESCO advocating for guidelines on ethical AI in heritage (Pasikowska-Schnass and Lim, 2023). This ethical gap is a primary driver for the development of the IAM-CDH and its dedicated focus on the “Digital and Informational Ecosystem.”

Materials and methods

This study adopted a qualitative and constructivist paradigm, acknowledging that “impact” is a socially constructed concept whose meaning varies by context. The research design is exploratory, using a comparative case study analysis supported by in-depth documentary analysis.

The research is guided by a conceptual model that maps the core components of the investigation and their interactions, as illustrated in Figure 1. This model illustrates how the traditional dimensions of museum impact (cultural, social, and economic) are mediated and enhanced by the integration of DC and DH. DC is positioned as a



foundational process that manages the entire lifecycle of digital assets, while DH provides the *analytical and participatory* tools to generate new knowledge and engagement from those assets.

The methodological process followed an iterative, three-stage structure, visualised in [Figure 2](#):

- i. **Foundation:** A systematic literature review was conducted to establish the state of the art on impact assessment in the cultural sector, the digital transformation of museums, and the theoretical roles of DC and DH. This informed the selection of the cases (the models) and the development of the analytical criteria;
- ii. **Development and Analysis:** The six international approaches—Europeana Impact Playbook, ISO 16687: 2025 Impact Assessment for Museums, MOI! Museums of Impact framework, Social Platform for Holistic Impact Heritage Assessment (SoPHIA) framework, inDICES Change Impact Assessment Framework, and Commonwealth Scientific and Industrial Research Organisation (CSIRO) Impact Evaluation Guide—were deliberately chosen to reflect a broad spectrum of current practices. The inclusion criteria required the models to have significant global relevance, be recently published or updated, and offer diverse methodological perspectives (ranging from qualitative, community-driven approaches to strict, quantitative standards).

Data from their core documentation were systematically extracted and coded using qualitative content analysis. This coding process was guided by four fundamental dimensions: first, the integration of the digital asset lifecycle, viewing curation as a prerequisite for generating value; second, their alignment with interoperability protocols and standards, notably the Findable, Accessible, Interoperable, Reusable (FAIR) data principles; third, the inclusion of participatory approaches, distinguishing passive consumption from active knowledge co-creation with stakeholders; and, finally, their approach to holistic sustainability and ethical governance, evaluating specific factors such as the environmental impact of digital infrastructures, data privacy, and AI bias.

This analysis identified convergences, divergences, and critical gaps, particularly the lack of a holistic framework that systematically links DC and DH to impact;

- iii. **Synthesis and Proposal:** The IAM-CDH framework was developed through a process of synthesis, integrating and adapting the key indicators and strengths identified within the six international models. This empirical foundation was further enriched by theoretical principles from DC (notably the d-KISTI model, [Rhee, 2024](#)) and DH analytical methodologies. The 45 specific indicators comprising the proposed model are therefore theoretically grounded, representing a direct translation of the comparative analysis outcomes.

This three-stage process was underpinned by a deliberately iterative and reflexive methodology, as illustrated in [Figure 2](#). The research design was not strictly linear; instead, it operated as a continuous cycle. As depicted by the feedback loop connecting the Synthesis (Stage 3) back to the Foundation (Stage 1), insights gained during the development of the IAM-CDH—particularly the identification of specific DC and DH intersections—required a recursive return to the literature review to refine the analytical criteria. This reflexive stance ensured that the proposed model is not merely a theoretical construct but a direct, evidence-based response to the identified limitations of current practices, grounded in both established theory and innovative approaches ([Busetto et al., 2020](#); [Nicmanis, 2024](#)).

Results

Analysis of existing models: a comparative overview

The comparative analysis of the six approaches, which is summarised in [Table 1](#), reveals a diverse methodological landscape, with each model offering distinct strengths and significant limitations. A detailed, in-depth breakdown of this comparative analysis is available in the [Supplementary Table S1](#).

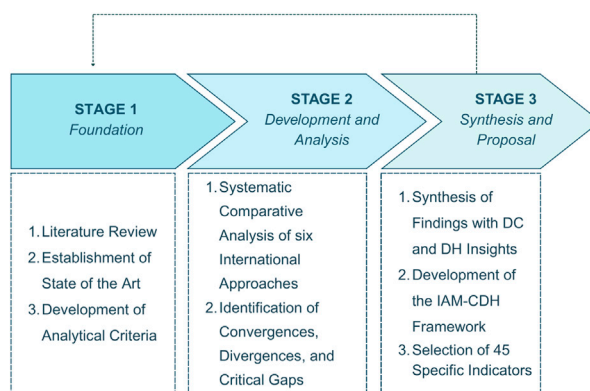


FIGURE 2
Iterative Process of the Research Methodology. Source: own elaboration.

TABLE 1 Summary of comparative analysis of six impact assessment approaches. Source: own elaboration.

Model	Primary goal	Methodological approach	Key strengths	Key limitations
Europeana Impact Playbook (McNeilly et al., 2024; Verwayen et al., 2017)	Evaluate value generated by digital heritage activities	Flexible, qualitative, participatory, narrative-focused	Strong on digital impact, stakeholder engagement, ToC	Can be resource-intensive, less standardised
ISO 16687:2025 Impact assessment for museums (International Organization for Standardization, 2025a; International Organization for Standardization, 2025b; Ochôa and Pinto, 2024)	Standardise museum impact assessment globally	Normative, quantitative, fixed procedures	High comparability and rigour, useful for formal reporting	Low flexibility, limited capture of contextual nuances and digital specifics
MOI! Museums of Impact (MOI! Museums of Impact, 2022)	Facilitate internal self-assessment for social impact	Holistic, qualitative, focused on organisational learning	Strong on social impact, continuous improvement, internal capacity building	Limited external comparability, less focus on digital metrics
SoPHIA Social Platform for Holistic Impact Heritage Assessment (SoPHIA, 2021b; Wollentz, 2023)	Provide a holistic, multidimensional assessment	Hybrid (normative and participatory), co-creative	Comprehensive (social, cultural, economic, environmental), strong stakeholder focus	High qualitative component can make measurement complex
inDICES Change Impact Assessment Framework (Tartari et al., 2023)	Measure the impact of digital transformation in Cultural and Creative Industries	Innovative, data-driven, focused on digital metrics	Strong on digital innovation, participation, and new technologies (AI)	Requires high technical expertise, less focus on traditional social/cultural impact
CSIRO Impact Evaluation Guide (CSIRO, 2024)	Rigorously evaluate the impact of scientific research	Quantitative, based on value chains and causal analysis	Methodologically robust, strong on economic and environmental impact	Complex, data-intensive, less adaptable to intangible cultural value

The Europeana Impact Playbook is distinguished by its flexible, participatory, and narrative-focused approach, structured as an iterative four-phase cycle (Design, Measurement, Narration, and Evaluation), building on the principles of Simon Tanner’s Balanced Value Impact Model (Tanner, 2012). Strongly guided by the ToC, it operationalises this through tools such as the “Value Lenses” (e.g., utility, learning, community, legacy) and its “Change Pathway Canvas.” Its primary contribution is shifting the conversation from quantitative outputs to qualitative, transformative outcomes, allowing institutions to articulate their value through storytelling and analyse significant societal and cultural changes (McNeilly et al., 2024; Uzelac and Lovrinić Higgins, 2025; Verwayen et al., 2017). However, while highly adaptable, its flexibility can make direct, cross-institutional standardisation challenging. Furthermore, as identified in our analysis, while it champions digital impact, its guidance on measuring the efficacy of underlying DC processes (e.g., information lifecycle management) or the ethical governance of AI and FAIR data remains high-level. It excels at articulating the narrative of impact, but a gap remains in providing a structured methodology to assess the quality of the curatorial inputs that enable that impact, a gap the IAM-CDH aims to address.

In contrast, the ISO 16687:2025 (Impact assessment for museums) standard aims for formal standardisation. Published in May 2025, its core purpose is to “define and describe methods for measuring and assessing the impact of museums on

individuals and on society” (International Organization for Standardization, 2025a). The standard’s strategic objectives are explicit: to “quantify impacts”, “inform strategic decisions”, and “Foster Transparency to promote accountability in reporting” (European Standards, 2025).

It defines impact as the “change (tangible or intangible) in an individual or group resulting from the contact with museum services” (International Organization for Standardization, 2025a, sect. 3.24) and identifies types of impacts, such as “pleasure and entertainment during a visit” (positive emotion can lead to a greater impact); “learning and research” (finding information relevant to a question or research topic; learning or finding material to teach) and “community value” (knowing and valuing your community or region—a sense of belonging) (Ochôa and Pinto, 2024).

While its strength is this methodological rigour, its normative nature inherently limits adaptability when confronted with digital realities. Based on available analyses of the standard, its fixed procedures appear to offer low flexibility to capture contextual nuances or emergent digital dimensions and are ill-equipped to capture the contextual nuances of emergent, participatory practices central to DH, and reportedly do not provide a robust framework for assessing the ethical governance of AI or the specific quality of DC practices. It effectively measures the *outcomes* of established museum services but struggles to evaluate the *processes* of digital innovation itself.

The MOI! Museums of Impact framework shifts the focus to internal organisational learning. It is a flexible, holistic self-evaluation tool designed to support European museums in measuring and maximising their social impact, promoting critical reflection and the continuous development of their institutional mission. This project reflects the growing recognition of museums as agents of social and cultural transformation (BAM!, Greek Ministry of Culture et al., 2022; NEMO - The Network of European Museum Organisations, 2019). It is structured around eight modules (four “Enablers” – focused on internal factors that are essential for creating the conditions that allow museums to achieve a significant impact—and four “Impact” areas—which assess priority areas for museums as agents of social transformation) (Ochôa and Pinto, 2024). Instead of fixed indicators, it uses 151 “impact statements” to guide qualitative reflection and internal dialogue. Its strength is in building institutional capacity and fostering a culture of continuous improvement. However, this internal focus means it is not designed for external comparability, and it places less emphasis on specific metrics for digital transformation.

Its focus on Developmental Evaluation is a significant contribution, positioning assessment as a tool centred on continuous learning and improving internal capabilities, complementing traditional models by emphasising innovation and adaptation to social and cultural changes (Koski and Teräsvirta, 2021). It excels at strengthening social relevance and organisational culture. Designed as an accessible and free-to-use resource, the framework promotes critical reflection on the role of museums as agents of change for resilient, inclusive and sustainable communities (Hamari, 2022). This internal focus, however, is also its primary limitation in the context of digital transformation. While the framework includes “digital engagement” as an enabler, it lacks the specific, granular indicators needed to assess the quality of DC (e.g., data lifecycle management), the ethics of data management, or the impact of DH-driven research. It is designed to help a museum reflect on its social mission, but not to deeply evaluate the complex technological and informational ecosystem that underpins that mission in the digital age.

The SoPHIA framework, a result of a Horizon 2020 project, offers a hybrid and multidimensional model designed to capture the complex, intersecting impacts of cultural heritage, offering a flexible conceptual and practical framework, adaptable to different contexts and capable of measuring the contribution of heritage to sustainable development and resilience to change (Wollentz, 2023). Its most significant contribution is its foundational emphasis on stakeholder participation and co-creation. The model is structured along three axes: Time (ex-ante, ongoing, and ex-post evaluation), People (integrating diverse stakeholder perspectives), and Domains (six thematic areas, including “Social Capital and Governance” and “Education, Creativity and Innovation”) (SoPHIA, 2021b; Wollentz, 2023). While exceptionally strong in contextualising impact and promoting inclusive evaluation, its highly qualitative and participatory nature can make systematic standardisation challenging.

This framework’s validation through twelve diverse European case studies demonstrates its applicability, and it is particularly strong in capturing social capital, governance, and quality of life

(SoPHIA, 2021a). However, while it includes “Digitisation, Science and Technology” as one of its 28 sub-themes, the digital ecosystem is not a central, structural component of the model (SoPHIA, 2021b). The framework is not designed to assess the *quality* of DC (e.g., FAIR data, preservation lifecycle) or the *ethics* of AI, but rather the social and cultural outcomes of interventions that *might* be digital. It provides an excellent model for participatory assessment but lacks the specific digital and informational focus required by the IAM-CDH.

The inDICEs Change Impact Assessment Framework, also a result of a Horizon 2020 project, is the most specialised model in our analysis, focusing explicitly on measuring the socio-economic impacts of digital transformation and participatory digital culture. Faced with the challenges imposed by digitalisation on access to, production and consumption of cultural goods, inDICEs aims to provide the Cultural and Creative Industries with tools to promote their competitiveness, sustainability and relevance in the contemporary digital landscape. The framework proposes eight specific “Areas of Impact” for digital participation, including “Innovation and knowledge,” “Social cohesion,” and “New forms of Entrepreneurship.” Its primary strength is its dedicated focus on novel digital metrics (e.g., FAIR data, AI) and its clear objective to empower cultural heritage institutions to understand their value in the digital single market (Tartari et al., 2023).

However, the inDICEs project itself identified a critical challenge: the “participation gap.” This describes the tendency for audiences to remain passive consumers (e.g., in data consumption) rather than active co-creators, even when digital platforms for participation are available (Tartari et al., 2023, p. 8). While the framework excels at mapping the potential impacts of digital participation, it offers less guidance on how to evaluate the quality of the underlying curatorial and managerial practices required to bridge this gap. Furthermore, as identified in our analysis, its approach to sustainability is more focused on the content of initiatives (e.g., environmental awareness) rather than the operational footprint of the digital infrastructure itself. This highlights a need for a model that not only measures digital participation but also assesses the foundational curatorial and technical strategies that foster meaningful co-creation and ensure holistic digital sustainability.

Finally, the CSIRO Impact Evaluation Guide, while developed for scientific research, provides a model of high methodological rigour. Grounded in a value chain logic and causal (contrafactual) analysis to isolate the specific impact of an intervention, its purpose is twofold: it functions not only as an advocacy tool to demonstrate research relevance to stakeholders (governmental, corporate, and civil society), but also as an internal strategic planning tool for resource optimisation, organisational learning, and continuous improvement (CSIRO, 2024).

The framework employs a “triple-bottom-line” approach, assessing the economic impacts (changes in local, national, or global economic systems), social impacts (encompassing community wellbeing, health, equality, social cohesion, resilience, and security), and environmental impacts (effects on natural systems) of its activities (CSIRO, 2024).

Its primary strength is this ability to build a robust, evidence-based, quantitative case for impact. As confirmed by expert

communication during our research, this logic is being adapted for museum use, primarily as an ex-ante strategic planning tool to map “impact pathways”. However, its scientific and economic origins present significant limitations for the cultural sector. The model is highly complex and data-intensive, and it is fundamentally ill-suited to capturing the intangible, qualitative, and often non-linear impacts central to cultural participation and digital engagement.

The analysis shows that these instruments can be broadly grouped. On one hand, frameworks such as the *Europeana Impact Playbook* and *SoPHIA* prioritise flexible, qualitative, and participatory methods that excel at capturing contextual value. On the other hand, the prescriptive ISO 16687:2025 standard and the *CSIRO guide* prioritise standardisation and causal analysis, which ensures comparability but can miss the nuances of cultural and digital transformation. Finally, specialised tools namely *MOI!* and *inDICEs* focus on internal organisational learning and the specific impacts of digital participation and transformation, respectively.

Despite their individual strengths, the analysis confirms that while the field of museum impact assessment is maturing, it faces four persistent challenges that limit the effectiveness of current approaches in the digital era:

- i. **Measuring Significant Digital Change:** Most models struggle to move beyond simple *output* metrics (e.g., website visits, number of digitised items) to assess deeper *outcomes* and *impacts*, such as the quality of online engagement, the value generated from data reuse, or the acquisition of new digital literacy skills by the public.
- ii. **Lack of a Systematic Approach to Ethics:** While data privacy is mentioned, there is a general absence of integrated frameworks for assessing the ethical governance of data, algorithmic transparency, and the potential biases of AI in the cultural sector. This is a critical gap as museums increasingly adopt AI for collection management and public interaction.
- iii. **An Incomplete View of Sustainability:** The cultural pillar of sustainability is often implicit rather than a core dimension. Furthermore, the environmental impact of digital infrastructures themselves, an often-invisible ecological cost of servers and data storage, is rarely considered.
- iv. **Proving Long-Term Impact:** Attributing long-term societal change unequivocally to a specific museum intervention remains one of the greatest methodological hurdles for the entire field.

These limitations highlight the need for a new approach that systematically integrates the value generated by digital and participatory practices, while also being pragmatic and oriented towards continuous improvement.

Indeed, [Uzelac and Lovrinić Higgins \(2025\)](#), p. 8) highlight the lack of consensus on assessment standards for digital heritage, a process hindered by financial constraints, skills shortages, and the inherent complexity of the projects. Frequently, the focus on easy-to-collect metrics obscures the assessment of real value and “significant change” – a deviation from the central objective of the data value chain itself. This observation reinforces the relevance of developing a model that

not only integrates multiple impact dimensions, but which is also operational and promotes the necessary digital maturity in the sector, while at the same time recognising the assessment process itself as a benefit for institutional learning ([Uzelac and Lovrinić Higgins, 2025](#)).

Our comparative analysis identified that, beyond classic indicators (e.g., visitor numbers or economic return), the following dimensions and indicators emerge as key differentiators in measuring the impact of DC and DH: i) digitisation and data management (indicators on the quality of digitised assets (FAIR compliance), metadata richness, and interoperability); ii) digital engagement and interaction (metrics on the depth of interaction, user experience quality, and qualitative feedback); iii) co-creation and public participation (indicators measuring citizen contributions to participatory curatorship and collaborative knowledge production); and iv) innovation and sustainability (Cultural and Digital) (indicators assessing the implementation of interdisciplinary projects, integration of emerging technologies (such as AI), and the robustness of long-term digital preservation strategies).

Foundations for a new model: the contributions of DC and DH

Overcoming the identified gaps requires the integration of principles from DC and DH, which provide the theoretical and methodological foundations for a more sophisticated evaluation ([Ochôa and Pinto, 2024](#); [Uzelac and Lovrinić Higgins, 2025](#)). A complete assessment model requires a prior step: evaluating the management quality of the digital asset that generates impact. It is here that the contributions of DC and DH become fundamental.

Digital curation and the creation of informational value

DC transcends mere technical preservation ([Higgins, 2018](#)). It is a continuous process that guarantees the management of digital data throughout its entire lifecycle, from planning to reuse. However, to assess the impact generated by these digital assets, we must first be able to assess the quality of their management.

Seminal models including the Digital Curation Centre Curation Lifecycle Model (a framework providing a “high-level overview of the stages required for successful curation and preservation” ([Constantopoulos et al., 2009](#), p. 38)), while foundational, were developed with a strong emphasis on passive preservation and stability. This approach is often aligned with an archival paradigm, exemplified by the Open Archival Information System (OAIS) reference model, which provides the theoretical framework for a complete archival system dedicated to the long-term preservation of digital information ([International Organization for Standardization, 2025c](#); [Navale and McAuliffe, 2018](#)). This “preservationist” stance is insufficient for evaluating the active, transformative impact of digital engagement, participation, and AI-driven initiatives.

This is why our framework draws on principles from advanced, value-oriented lifecycle models, particularly the d-KISTI Digital Curation Lifecycle Model ([Rhee, 2024](#)). This model is particularly

relevant as its DC perspective actively moves beyond mere preservation, re-conceptualising curation as a process of active value creation through phases such as “Transform” and “Reappraise,” as core, sequential parts of the lifecycle, rather than occasional actions, thereby establishing the high-quality data foundation indispensable for DH analysis and the creation of new value.

This perspective aligns with the conceptualisation of museum objects as “information-as-thing” (Latham, 2012). The informational potential of this “thing” (a digital scan, a dataset, an object’s metadata) remains latent until it is activated. Impact, therefore, is the result of this activation. Through active curation (DC) and analysis (DH), the static “information-as-thing” is transformed into:

- a. “Information-as-process”: The dynamic interaction, such as a visitor exploring a 3D model, a researcher querying a database, or a citizen participating in a transcription project.
- b. “Information-as-knowledge”: The intangible outcome of that process, such as a student’s new understanding, a new academic publication, or a community’s enriched sense of identity.

Crucially, this value-oriented DC perspective dictates the necessary components for digital impact assessment. Accordingly, the five core components, comprising the ‘full lifecycle actions’, of the d-KISTI model (Rhee, 2024) provide the theoretical foundation for the curatorial principles in our proposed framework and function as measurable quality criteria for a museum’s digital strategy:

- a. Curation Planning and Management: This provides the strategic basis for assessment by defining objectives, resources, and institutional alignment, against which impact can be measured.
- b. Description, Identification, Linkage: The quality of this action (e.g., adherence to FAIR principles, metadata richness) determines the quality of the ‘information-as-thing’ itself, setting the precondition for all subsequent impact.
- c. Stakeholder Observation and Collaboration: This continuous action directly informs impact assessment by identifying who the stakeholders are and what “impact” means to them, moving beyond institutional assumptions.
- d. User and Use Investigation: This provides the raw data to assess “information-as-process” – how assets are used in practice—allowing measurement of outcomes (the effects of utilisation on users) rather than just outputs (how much is available).
- e. Technology Watch: This directly informs the assessment of sustainability and innovation by tracking technological obsolescence and opportunities.

A qualified management of the information lifecycle—which ensures the richness of metadata, interoperability (FAIR principles), and sustainable preservation—is, therefore, a precondition for digital assets to generate impact. Thus, better assessment leads to better curation, and better curation generates

greater and more sustainable impact. Applying impact assessment directly to curatorial practice, informed by this model, creates a “virtuous cycle” (the results of the evaluation are not just a final report, but learnings that allow for the continuous improvement of that same practice):

- Better curation enables better assessment: By applying the principles of DC (e.g., FAIR principles, metadata quality, as inspired by the d-KISTI model), institutions generate higher-quality, more reliable data. This data makes the measurement of impact (using the IAM-CDH) more accurate and meaningful.
- Better assessment improves curation: The results of the impact assessment (e.g., insights from DH-driven text analysis on user engagement or tracking data re-use via Application Programming Interfaces (APIs), which allow different software to communicate and share data automatically) provide direct feedback. This feedback allows curators to refine their digital strategies (e.g., specifically their ‘Curation Planning and Management’ (d-KISTI)), improve data management, and demonstrate the value of their curatorial work, thus justifying further investment in high-quality DC.

Digital humanities as an analytical and participatory vector

DH, in turn, offers the methodologies to analyse and interpret the value generated by curated assets. Its analytical tools—including text mining of visitor comments to reveal qualitative perceptions, or network analysis to map knowledge dissemination—allow for a more granular understanding of public engagement (Ochôa and Pinto, 2024). This is exemplified by frameworks such as the Impactomatrix from DARIAH-DE, which provides specific criteria for assessing the impact of digital research infrastructures (Gnadt et al., 2017).

Simultaneously, its participatory approaches (citizen science, crowdsourcing, collaborative curation) provide the means not only to foster co-creation but also to analyse the quality and impact of these contributions on enriching museum narratives and strengthening communities, helping to overcome the “participation gap” (Tartari et al., 2023, p. 8). These approaches, which transform the public into co-creators, are often driven by EU funding programmes such as Horizon 2020 that promote collaborative processes of “citizen curation” (Marras et al., 2023). Ultimately, these initiatives represent a unique opportunity to democratise access to culture by decentralising the traditional focus of decision-making from experts to visitors, thereby promoting a plurality of interpretations (Hupperetz, 2022; Rollo, 2020).

A practical example of this DC/DH convergence in impact assessment is found in the Museums and Events—Measuring Impact on local eNvironment with Data analytics (ME-MIND) project (Runnel et al., 2021). This initiative demonstrated how a DC-informed approach (managing the data lifecycle from heterogeneous internal and external sources) combined with DH methodologies (advanced data analytics and visualisation) could measure the socio-economic impact of cultural institutions. A key output, the “Impact Canvas” (Coli and Vengerfeldt, 2022), provides a strategic tool that maps the entire data-to-impact pathway, including inputs, activities,

outputs, outcomes, and specific data sources. The ME-MIND project serves as a clear precedent, validating the feasibility of integrating data lifecycle management and advanced analytics into a practical, holistic assessment framework, moving from data collection to data-driven storytelling.

Proposal: the IAM-CDH framework

In response to the identified gaps, this paper proposes the IAM-CDH. This framework is designed as a hybrid and multidimensional tool that aims to harmonise methodological rigour with contextual flexibility, placing DC and DH at the core of the evaluation process. Its structure is based on a value chain logic informed by the ToC, mapping the path from institutional resources to long-term societal impact. The IAM-CDH is organised around five interconnected thematic dimensions, which provide a holistic lens for assessing a museum's performance, as outlined in the framework in [Figure 3](#).

The five dimensions of the IAM-CDH

A. **Digital and Informational Ecosystem:** Assesses the quality, ethics, and sustainability of the museum's digital assets. Driven by DC and DH, it moves beyond simple access metrics to evaluate the effectiveness of curatorial practices through indicators on metadata quality (FAIR principles) and the ethical governance of data and AI. This governance is based on normative principles aligned with international guidelines for Trustworthy AI, including transparency (e.g., in algorithmic decision-making), explainability, and data privacy (e.g., General Data Protection Regulation (GDPR) compliance), while also incorporating the crucial concepts of participation and digital sustainability ([European Commission: Directorate-General for Communications Networks, Content and Technology and High-Level Expert Group on Artificial Intelligence, 2019](#)). Its focus is on the responsibility and integrity of the informational ecosystem that the museum builds. This dimension is

included because traditional models, such as MOI! or the ISO standard, lack this deep, granular focus on the quality and ethics of digital assets, often focusing on outputs rather than the sustainability of the data itself. This dimension, therefore, operationalises the DC lifecycle (drawing from d-KISTI) as a core, measurable component of impact.

- B. **Participation and Co-Creation:** measures the transition of the public from spectator to co-creator. Empowered by DH methods, its indicators assess the quality of engagement in participatory initiatives (e.g., crowdsourcing, citizen science projects) and their tangible impact on knowledge production, including co-created exhibitions and publications. This is operationalised through specific digital tools, such as online platforms for crowdsourced transcription of historical documents or collaborative mapping projects where communities add their own stories and memories to museum collections. This dimension expands on the strong participatory focus of models notably SoPHIA and inDICES but shifts the emphasis from the mere act of participation to its qualitative impact on knowledge production (co-created outputs), directly linking to DH-driven methods.
- C. **Sociocultural and Educational Impact:** addressing the museum's core social mission, this dimension evaluates the promotion of diversity, inclusion, wellbeing, and social cohesion. It specifically measures the development of digital and informational literacy, analysing how DC ensures equitable access to quality information and how DH tools can assess the capacity of museum programmes to capacitate audiences for a critical, creative, and safe interaction with heritage in an inclusive digital ecosystem. This integrates the strengths of models such as MOI! (social relevance) and Europeana (learning) while elevating digital and informational literacy to a key, measurable impact outcome, a component often overlooked by traditional educational metrics.
- D. **Culture as a Pillar of Sustainability:** frames the museum's activities within a holistic sustainability paradigm, elevating the concept from a theoretical background (as in [Hawkes, 2001](#)) to a core, measurable dimension. It evaluates the safeguarding of heritage, the promotion of cultural diversity and artistic vitality, and the environmental sustainability of both physical and digital operations. Crucially, it uses DC strategies (e.g., data appraisal and storage optimisation) to measure and mitigate the often-overlooked ecological impact of technological infrastructure (e.g., server carbon footprints and data storage), a critical gap in almost all other frameworks, thus making the environmental footprint of digital heritage a core component of the assessment ([Tansey, 2024](#); [Uzelac and Lovrinić Higgins, 2025](#)).
- E. **Innovation and Interdisciplinary Collaboration:** measures the museum's capacity to innovate and act as a catalyst in the broader creative and knowledge ecosystem, building on innovation concepts found in models including CSIRO and inDICES but reframing them through the specific lens of DC and DH. It assesses the impact of strategic partnerships and the critical application of emerging technologies. Specifically, it measures how DC's open data

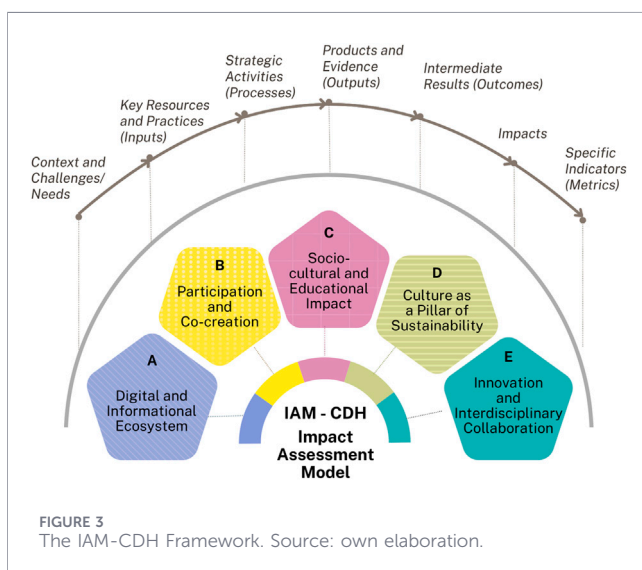


FIGURE 3
The IAM-CDH Framework. Source: own elaboration.

TABLE 2 Dimensions, sub-dimensions, and indicators of the IAM-CDH framework. Source: own elaboration.

Dimension	Sub-dimensions	Example of specific indicator
A. Digital and informational ecosystem	<ul style="list-style-type: none"> Ethical governance of data, AI, and emerging technologies Strategic use of digital technologies and platforms Digitisation, curation and management of collections and metadata Ethical data governance and emerging technologies Sustainable digital preservation and long-term accessibility Data reuse and impact on research/teaching 	<ul style="list-style-type: none"> Existence and application of policies on privacy, ethical data use, and informed consent (GDPR) Level of transparency regarding the use of AI systems and mitigation of algorithmic bias
B. Participation and co-creation	<ul style="list-style-type: none"> Collaborative participation Impact on knowledge production 	<ul style="list-style-type: none"> Level of active participation and co-creation (e.g., volume of user-generated content, contributions to crowdsourcing/citizen science projects) Number of co-created outputs (e.g., exhibitions, publications) resulting from participation
C. Sociocultural and educational impact	<ul style="list-style-type: none"> Public involvement Inclusion and accessibility Development of digital and information skills 	<ul style="list-style-type: none"> Number and impact of training programmes in digital and informational skills for professionals and the public Evidence of diversity in collections and programming, and accessibility compliance (physical and WCAG - Web Content Accessibility Guidelines)
D. Culture as a pillar of sustainability	<ul style="list-style-type: none"> Safeguarding heritage and preserving cultural memory and identity(ies) Fostering skills, knowledge and artistic-cultural vitality Promoting cultural diversity, intercultural dialogue and social inclusion through culture Cultural governance and partnerships for integral sustainability Environmental sustainability of cultural and digital operations 	<ul style="list-style-type: none"> Assessment of the carbon footprint of digital infrastructures (servers, data storage) and implementation of reduction measures Effectiveness of heritage safeguarding policies for physical and digital collections
E. Innovation and interdisciplinary collaboration	<ul style="list-style-type: none"> Partnerships and collaborations Application of emerging technologies Contribution to innovation in the cultural and creative sector 	<ul style="list-style-type: none"> Number of reuses of the museum's open data (APIs, datasets) by third parties (researchers, creative industries, educators) Number and diversity of active interdisciplinary partnerships (e.g., with universities, tech labs)

practices (aligned with the Open GLAM principles) and DH's collaborative networks foster innovation, gauged through tangible outcomes such as the reuse of the museum's open data (e.g., datasets made available via APIs) by third parties, measuring the museum's role as a catalyst via its curated digital assets.

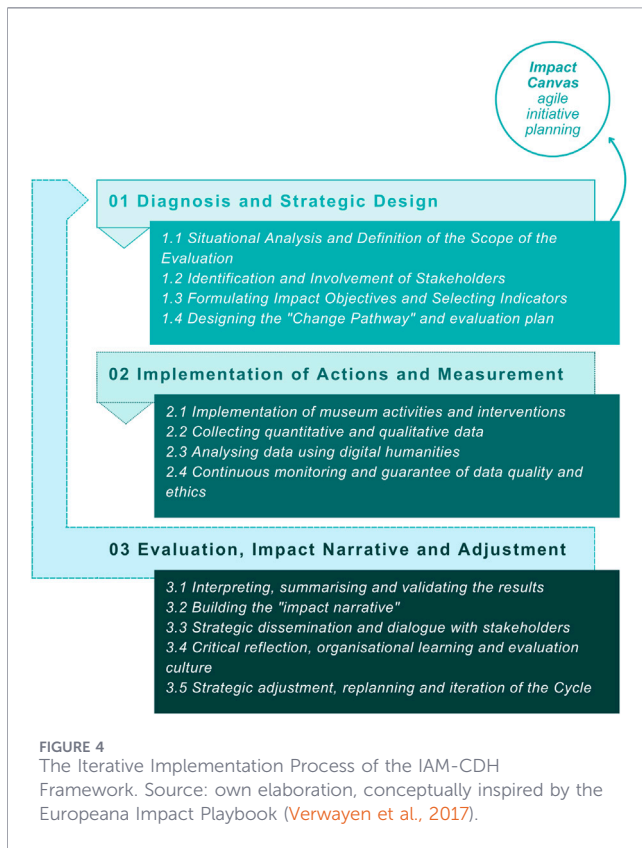
Indicators

To operationalise this multidimensional approach, the IAM-CDH proposes a set of 45 specific indicators. These indicators were selected to ensure a balanced evaluation, combining quantitative metrics (e.g., usage statistics, carbon footprint data) with qualitative assessments (e.g., narrative evidence of social impact, ethical compliance levels). [Table 2](#) summarises the framework's structure, presenting the core dimensions, their sub-dimensions, and an example indicator for each, designed to enhance clarity and practical application. A more detailed version of this framework, including a full list of metrics, theoretical justifications, and links to existing models, is available in the [Supplementary Table S2](#).

Operationalisation and implementation

While the five dimensions and their underlying value chain logic define what the IAM-CDH assesses, its operationalisation defines how it is applied. The implementation process is designed to be iterative and cyclical, inspired by the learning philosophy of the Europeana Impact Playbook ([Verwayen et al., 2017](#)), and is structured in three interdependent macro-stages that transform assessment from a reporting exercise into an engine for continuous organisational learning:

- i. **Diagnosis and Strategic Design:** establishes the context and scope of the evaluation. It involves a situational analysis of the institution, the identification and engagement of key stakeholders, the formulation of clear impact objectives for each IAM-CDH dimension, and the mapping of the "Change Pathway". This step formalises the underlying ToC by mapping the logical links between inputs, activities, outputs, outcomes and impacts, serving as the basis for a detailed evaluation plan. This ensures that the



- assessment is aligned with the museum's mission and resources from the outset. To facilitate the practical application of this planning phase, we propose the use of the IAM-CDH Impact Canvas (Supplementary Figure S1). Adapted from the ME-MIND project's framework (Coli and Vengerfeldt, 2022), this tool has been tailored to specifically integrate the five dimensions and indicators of the IAM-CDH, helping to structure the initial ideas for each initiative.
- ii. Implementation of Actions and Measurement: focuses on executing the planned activities and systematically collecting the data needed to assess progress. It involves a hybrid data collection approach, combining quantitative metrics (e.g., digital platform analytics, surveys) with qualitative methods (e.g., interviews, focus groups, impact narratives). DH methodologies, such as sentiment analysis or social network analysis, can be employed here to process and interpret complex datasets.
 - iii. Evaluation, Narration, and Continuous Adjustment: dedicated to the interpretation of data, the communication of results, and the integration of learnings into future practices. This includes building a compelling "impact narrative" based on the evidence collected and validating the findings with stakeholders. Crucially, the conclusions are used to inform strategic decision-making, adjust programmes, and refine the assessment model itself, thus closing the iterative loop and fostering a sustainable culture of evaluation.

This entire implementation process is illustrated in Figure 4.

Operationalisation of IAM-CDH: an illustrative example

To clarify its application, consider a hypothetical case: a museum launches a participatory project using DH methods (Dimension B) to crowdsource the transcription of historical letters (Dimension A).

The IAM-CDH would guide the assessment by measuring:

- Inputs: The quality of the digitised letters (FAIR data), the robustness of the transcription platform (DC), and the clarity of the ethical guidelines for user-submitted data (Dimension A).
- Outputs: Number of letters transcribed, number of active participants, volume of user-generated content (Dimension B).
- Outcomes: Development of new digital skills for participants (Dimension C), creation of new, searchable research data (Dimension A and E), and a strengthened sense of community ownership (Dimension C). Data collection methods would include platform analytics, a post-project participant survey (quantitative/qualitative), and focus groups with participants (qualitative).
- Impact: The long-term contribution to open knowledge, the democratic enrichment of the museum's narrative, and the enhanced digital literacy of its community (Dimension C and E).

This example demonstrates how the model links curatorial practices (the quality of the data) and DH methods (the participatory platform) to measurable sociocultural and educational outcomes, moving beyond simple production metrics.

Discussion

The IAM-CDH as a response and its implications

This study's comparative analysis identified persistent challenges in existing approaches, namely in measuring deep digital change, systematic ethics, holistic sustainability, and long-term impact. The IAM-CDH framework is proposed as an exploratory and theoretical response to these four challenges. It is a comprehensive, interdisciplinary framework that integrates digital, participatory, and ethical indicators. The framework, therefore, proposes to reconfigure impact assessment by introducing a crucially informational perspective. It integrates the valuable contributions of existing assessment approaches with the rigour of DC lifecycle management and the analytical activation tools of DH, focusing on specific metrics for AI Ethics and Digital Environmental Sustainability. By focusing on the quality of the informational ecosystem, fostering meaningful participation, embracing sustainability, and promoting innovation, the IAM-CDH responds to the evolving mission of museums in the 21st century.

The primary contribution of this model, as previously established, is its integration of DC and DH as foundational components, which reframes evaluation as a "virtuous cycle". This conceptual reframing has significant implications for practice. By positioning high-quality curatorial management as a "prerequisite"

for meaningful assessment, the model advances the current understanding of the problem. It moves impact evaluation from a retrospective exercise in accountability to a concurrent, strategic management tool. In this view, the results of an assessment are not an end point, but direct, actionable feedback for curators to refine their digital strategies. This model moves beyond asking “what was our reach?” and instead provides a structure to answer, “what significant, ethical, and sustainable change did our curatorial practices and digital engagement generate?”

The comparative analysis, therefore, serves not only to identify these persistent challenges but also to highlight the significant strengths that each framework offers. The proposed IAM-CDH model is a synthesis that builds upon the foundational contributions of these approaches. It is inspired by the importance of narrative construction and the participatory ethos found in flexible models, exemplified by the Europeana Impact Playbook and SoPHIA. It incorporates the methodological rigour and focus on causality from normative approaches such as ISO 16687:2025 and the CSIRO guide. Furthermore, it addresses the critical need for specific metrics for digital transformation and a focus on organisational learning, drawing lessons from innovative frameworks, notably inDICES and MOI!. Thus, the IAM-CDH framework is presented as an integrated proposal designed to leverage these collective strengths while systematically addressing the identified gaps.

Importantly, while the present study employs the museum sector as its primary context, the underlying logic of the IAM-CDH framework transcends this specific domain. By focusing on the continuous management of the digital object lifecycle to activate informational value, the proposed model proves intrinsically adaptable to the wider GLAM ecosystem.

Ethical reflections and epistemological implications

The adoption of the IAM-CDH implies an ethical and epistemological reflection. DC is not a neutral process; it involves choices about what is kept, what is prioritised, and how it is described (decisions that shape memory and representation).

Epistemologically, this model, grounded in the “information-as-thing” theory (Latham, 2012), treats “impact” itself as an informational phenomenon. Value resides not only in the physical object but in its informational potential activated by curation, analysis (DH), and participation. This compels a fundamental shift: the museum is no longer just a guardian of objects, but an ethical manager and facilitator of information flows.

It is precisely this epistemological shift, derived from Buckland’s theory, that imposes new ethical responsibilities. If the museum’s core function is to manage and activate “information-as-thing”, then its ethical duties expand. The IAM-CDH positions the museum as an informational mediator with heightened responsibility. By assessing “Ethical Governance” (Dimension A), the model requires institutions to actively address the risks of reproducing technological or cultural inequalities, demanding transparency in algorithms and data management to prevent bias.

Limitations and future directions

As this study is conceptual in nature, its limitations must be discussed. First, the IAM-CDH is a conceptual framework. Its 45 indicators are theoretically grounded in the literature, but the model has not yet been empirically validated in diverse, real-world museum settings.

Second, the six comparative models were selected to provide a representative international baseline, sufficient for this study’s goal of conceptual synthesis. As the field of impact assessment is dynamic and new frameworks continuously emerge, future work could further validate and refine the IAM-CDH by comparing it against other national or domain-specific approaches.

Finally, the field is evolving rapidly. The indicators for ethical AI, in particular, will require constant revision as technology and regulation mature.

Future research must, therefore, focus on empirically validating and refining the IAM-CDH. We recommend the following primary avenues for this work:

1. **Pilot Studies:** The model should be tested in diverse museum contexts (e.g., large national museums, small community museums) and applied to specific digital initiatives (e.g., participatory platforms or open data projects) to analyse its feasibility, effectiveness, and adaptability.
2. **Tool Development:** There is significant potential for developing practical, open-source digital tools or dashboards that integrate with the IAM-CDH. Such tools could automate the monitoring of digital indicators and support data-driven decision-making, making robust impact assessment more accessible for small and mid-sized institutions.
3. **Ethical Governance of data and AI:** The ‘Digital and Informational Ecosystem’ dimension of the model focuses on the ethics of AI. Future research should deepen this area, developing robust methodologies for auditing algorithmic biases in digital collections and AI-generated exhibitions.

In conclusion, while exploratory in nature, this research suggests that DC and DH offer a theoretically robust foundation to reconfigure how museums assess and communicate their impact. The IAM-CDH is proposed as a conceptual framework to assist museums in navigating this new reality, seeking to support institutions not only in demonstrating value but in actively shaping it, turning evaluation from a reporting exercise into a strategic, reflexive, and transformative practice.

Data availability statement

Publicly available datasets were analyzed in this study. This data can be found here: This manuscript presents a qualitative comparative analysis and conceptual proposal (IAM-CDH), not an analysis of a single, raw dataset from a repository. The “existing data” analyzed were six international impact assessment models (Europeana Impact Playbook, ISO 16687:2025, MOI!, SoPHIA, inDICES, and CSIRO). The documentation for these sources is publicly available and fully cited in the References

section of the manuscript, which serves as the direct source repository for the documentary corpus analyzed.

Ethics statement

Ethical approval was not required for the study involving humans in accordance with the local legislation and institutional requirements. Written informed consent to participate in this study was not required from the participants or the participants' legal guardians/next of kin in accordance with the national legislation and the institutional requirements.

Author contributions

Specifically, MG and PO were jointly responsible for the conceptualisation, methodology, and investigation. MG was responsible for writing the original draft. PO provided supervision and handled the writing – review and editing. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declared that generative AI was used in the creation of this manuscript. The author(s) declare that AI-based tools were used in the preparation of this manuscript. Specifically, DeepL was used for assistance with translation, and Gemini (Google) was used for language refinement (such as clarity, coherence, and grammatical consistency) and ensuring consistency with journal formatting guidelines. These tools were used purely for language and formatting support, without influencing the authors' original content, arguments, or conclusions. The authors take full responsibility for the final content of the manuscript, including its factual accuracy and the integrity of all citations.

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontierspartnerships.org/articles/10.3389/ejcmp.2026.15930/full#supplementary-material>

References

- BAM!, Greek Ministry of Culture (2022). "Prussian cultural heritage foundation, network of european museum organisations (NEMO), estonian national museum, european museum academy, and Finnish heritage agency," in *MOI! Museums of Impact: a European model for assessing the social impact of museums*. Available online at: <https://www.bamstrategieculturali.com/en/portfolio/moi-museums-of-impact-2/> (Accessed June 5, 2024).
- Bernhardt, J., and Thiel, S. (2022). *Cultures of artificial intelligence—New perspectives for museums*. Karlsruhe: Badisches Landesmuseum.
- Boiano, S., Borda, A., Gaia, G., and Di Fraia, G. (2024). "Ethical AI and museums: challenges and new directions," in *Proceedings of EVA London 2024 (EVA 2024)*, 18–25. doi:10.14236/ewic/EVA2024.4
- Bollo, A. (2013). LEM report 3: Measuring museum impacts. *Learn. Mus. Netw. Proj.*
- Buckland, M. K. (1991). Information as thing. *J. Am. Soc. Inf. Sci.* 42 (5), 351–60. doi:10.1002/(SICI)1097-4571(199106)42:5<351::AID-ASIS>3.0.CO;2-3
- Busetto, L., Wick, W., and Gumbinger, C. (2020). How to use and assess qualitative research methods. *Neurological Res. Pract.* 2 (1), 14. doi:10.1186/s42466-020-00059-z
- Coli, E., and Vengerfeldt, P. P. (2022). Me-mind: D2.3 – business canvas model. Available online at: <https://www.memind.eu/the-project/> (Accessed May 7, 2025).
- Constantopoulos, P., Dallas, C., Androusoopoulos, I., Angelis, S., Deligiannakis, A., Gavrilis, D., et al. (2009). DCC&U: an extended digital curation lifecycle model. *Int. J. Digital Curation* 4, 34–45. doi:10.2218/ijdc.v4i1.76
- CSIRO (2024). Impact evaluation guide. *Australia's National Science agency*.
- European Commission (2021). *Horizon Europe strategic plan 2021-2024*. Luxembourg: Publications Office of the European Union. doi:10.2777/083753
- European Commission (2022). The deployment of a common European data space for cultural heritage | shaping Europe's digital future. Available online at: <https://digital-strategy.ec.europa.eu/en/news/deployment-common-european-data-space-cultural-heritage> (Accessed November 4, 2025).
- European Commission (2023). *Horizon Europe strategic plan 2025-2027 analysis*. Luxembourg: Publications Office of the European Union. doi:10.2777/637816
- European Commission: Directorate-General for Communications Networks, Content and Technology and High-Level Expert Group on Artificial Intelligence (2019). *Ethics guidelines for trustworthy AI*. Luxembourg: Publications Office of the European Union. doi:10.2759/346720

- European Standards (2025). BS ISO 16687:2025 impact assessment for museums. Available online at: <https://www.en-standard.eu/bs-iso-16687-2025-impact-assessment-for-museums/> (Accessed November 10, 2025).
- Gertrudes, M. M. S. R. (2025). *Museus em Transformação: análise dos Contributos da Curadoria e das Humanidades Digitais nos Modelos de Avaliação de Impacto [Museums in Transformation: an Analysis of the Contributions of Curatorship and Digital Humanities in Impact Assessment Models]* [Master's Thesis, NOVA University Lisbon]. Available online at: <https://run.unl.pt/handle/10362/190217> (Accessed November 8, 2025).
- Gnadt, T., Schmitt, V. E., Stiller, J., and Thoden, K. (2017). DARIAH-DE impactomatrix. Available online at: <https://dariah-de.github.io/Impactomatrix/> (Accessed May 3, 2025).
- Hamari, P. (2022). *The MOI framework – evaluate for impact*. Rome, Italy: ICOM Italia Convegno Nazionale.
- Hawkes, J. (2001). The Fourth Pillar of Sustainability: Culture's essential role in public planning. *Common Ground*.
- Higgins, S. (2018). Digital curation: the development of a discipline within information science. *J. Documentation* 74 (6), 1318–1338. doi:10.1108/JD-02-2018-0024
- Hupperetz, W. (2022). *Museums, Heritage, and digital curation. Theory and practice at the Allard pierson*. Leiden: Sidestone Press.
- ICOM (2022). *ICOM final report*. Paris: International Council of Museums (ICOM).
- International Organization for Standardization (2025a). ISO 16687:2025 Impact assessment for museums. Available online at: <https://www.iso.org/standard/84795.html> (Accessed July 19, 2025).
- International Organization for Standardization (2025b). ISO 16687:2025(en). impact assessment for museums. Available online at: <https://www.iso.org/obp/ui/fr/#iso:std:iso:16687:ed-1:v1:en> (Accessed July 19, 2025).
- International Organization for Standardization (2025c). ISO 14721:2025: space data systems -Reference model for an open archival information system (OAIS) (Version 3). Available online at: <https://www.iso.org/standard/87471.html> (Accessed July 19, 2025).
- Koski, M., and Teräsvirta, E. (2021). MOI! museums of impact project presentation—Open stakeholder forum for nordic museum professionals [video]. Helsinki: Finnish Heritage Agency. Available online at: <https://www.youtube.com/watch?v=0PXhuDNv3AE> (Accessed February 2, 2025).
- Latham, K. (2012). Museum object as document: using buckland's information concepts to understand museum experiences. *J. Documentation* 68, 45–71. doi:10.1108/00220411211200329
- Marras, A. M., Díaz-Kommonen, L., Stoneman, A., and Svinhufvud, L. (2023). *Digital technologies for citizen curation in museums: two case studies from the SPICE project*. Paris: International Council of Museums (ICOM). Available online at: <https://icom.museum/en/news/spice-project-digital-technologies/> (Accessed May 3, 2025).
- Matarasso, F. (1997). in Use or ornament? The social impact of participation in the arts. *Comedia: Stroud*.
- McNeilly, N., Marchini, C., and Staedtler, D. (2024). Europeana impact playbook helps to develop recommendations for cultural heritage metadata. *Eur. PRO*. Available online at: <https://pro.europeana.eu/post/europeana-impact-playbook-helps-to-develop-recommendations-for-cultural-heritage-metadata> (Accessed February 3, 2025).
- MOI! Museums of Impact (2022). MOI! Museums of impact. Available online at: <https://dev.ne-mo.org/cooperation-funding/networking-cooperation/previous-projects/moi-museums-of-impact> (Accessed February 4, 2025).
- Murphy, D. O., and Villaespa, D. E. (2020). The museums + AI network. *Museums + AI Network*. Available online at: <https://themuseumsai.network/home/impact/> (Accessed March 18, 2025).
- Navale, V., and McAuliffe, M. (2018). Long-term preservation of biomedical research data. *F1000Research* 7, 1353. doi:10.12688/f1000research.16015.1
- NEMO - The Network of European Museum Organisations (2019). MOI! museums of impact. Available online at: <https://dev.ne-mo.org/cooperation-funding/networking-cooperation/previous-projects/moi-museums-of-impact> (Accessed December 12, 2024).
- Nicmanis, M. (2024). Reflexive content analysis: an approach to qualitative data analysis, reduction, and description. *International Journal of Qualitative Methods* 23, 16094069241236603. doi:10.1177/16094069241236603
- Nikolaou, P. (2024). Museums and the post-digital: revisiting challenges in the digital transformation of museums. *Heritage* 7 (3), 1784–1800. doi:10.3390/heritage7030084
- Ochôa, P., and Pinto, L. G. (2024). “Digital convergence in cultural institutions: performance and impact evaluation models,” in *International Conference on Arts and Cultural Management AIMAC* (Lisbon).
- Pasikowska-Schnass, M., and Lim, Y.-S. (2023). *Artificial intelligence in the context of cultural heritage and museums: complex challenges and new opportunities*. Brussels: European Parliamentary Research Service. Available online at: [https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI\(2023\)747120](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2023)747120) (Accessed March 20, 2025).
- Rhee, H. L. (2024). A new lifecycle model enabling optimal digital curation. *Journal of Librarianship and Information Science* 56 (1), 241–266. doi:10.1177/09610006221125956
- Robbins, N., Thomas, S., Tuominen, M., and Wessman, A. (2021). *Museum studies – bridging theory and practice*. ICOFOM & University of jyväskylä. Open Science Centre.
- Rogers, P. (2014). “Theory of change: methodological briefs: impact evaluation,” 2.2. Florence. UNICEF Office of Research
- Rollo, M. F. (2020). Challenges and responsibilities of digital humanities: preserving memory, valuing heritage, promoting and disseminating knowledge. The memory for all program. *Estudos Históricos (Rio de Janeiro)* 33, 19–44. doi:10.1590/S2178-149420200001000003
- Runnel, P., Aljas, A., Pruulmann-Vengerfeldt, P., Tampere, K., De Cesare, A., Cerrai, M., et al. (2021). Me-mind: D2.2—guidelines report data and impact. Guidelines on how data helps to understand the impact of the CCIs. Available online at: <https://www.memind.eu/the-project/> (Accessed May 7, 2025).
- Sabatini, F. (2019). Culture as fourth pillar of sustainable development: perspectives for integration, paradigms of action. *European Journal of Sustainable Development* 8, 31. doi:10.14207/ejsd.2019.v8n3p31
- Schreibman, S. (2012). Digital humanities: centres and peripheries. *Historical Social Research/Historische Sozialforschung* 37 (141), 46–58. doi:10.12759/hsr.37.2012.3.46-58
- SoPHIA (2021a). *Social platform for Heritage impact assessment (SoPHIA)—Deliverable D2.2: case studies report* (Accessed July 19, 2025).
- SoPHIA (2021b). *Social platform for heritage impact assessment (SoPHIA)—Deliverable D2.3—Final version of the SoPHIA impact assessment model*. Available online at: <https://ocm.icrom.org/documents/social-platform-heritage-impact-assessment-sophia-case-studies-report> (Accessed February 9, 2025).
- Stylianou-Lambert, T., Boukas, N., and Christodoulou-Yerali, M. (2014). Museums and cultural sustainability: stakeholders, forces, and cultural policies. *International Journal of Cultural Policy* 20 (5), 566–587. doi:10.1080/10286632.2013.874420
- Tanner, S. (2012). *Measuring the impact of digital resources: the balanced value impact model*. London: King's College. Available online at: <http://www.kdcs.kcl.ac.uk/innovation/impact.html> (Accessed April 14, 2026).
- Tansey, E. (2024). “Environmental impact and digital preservation,” in *Digital preservation coalition*. doi:10.7207/twgn24-01
- Tartari, M., Manfredini, F., Pilati, F., and Sacco, P. L. (2023). inDICEs change impact assessment framework—measuring the impact of digital culture. *Culture Action Europe*. Available online at: <https://cultureactioneurope.org/knowledge/indices-change-impact-assessment-framework-measuring-the-impact-of-digital-culture/> (Accessed March 18, 2025).
- UCLG Committee on Culture (2010). Culture, the fourth pillar of sustainability | culture 21. Available online at: <https://www.agenda21culture.net/documents/culture-fourth-pillar-sustainability> (Accessed February 24, 2025).
- Uzelac, A., and Lovrinić Higgins, B. (2025). From data to impact: assessing the value of cultural heritage in the digital age. *Heritage* 8 (4), 117. doi:10.3390/heritage8040117
- Verwayen, H., Kyrou, P., Fallon, J., and Schellenberg, J. (2017). *The original Impact Playbooks—Phase 1/Impact Design*. The Hague: Europeana Foundation. Available online at: <https://europeana.atlassian.net/wiki/spaces/CB/pages/2353627154/The+original+Impact+Playbooks> (Accessed March 2, 2025).
- Wollentz, G. (2023). Increasing future awareness in the cultural heritage sector using the SoPHIA model. *Department of Cultural Sciences, Linnaeus University*. doi:10.15626/fkh.kv.2023.01