The Algorithmic Museum: Personalized Engagement and Ethical Implications

Ph.D. Manuel Scortichini
University of Camerino, Italy

13 November 2025

INDEX

CHAPTER 1 - Algorithmic museum

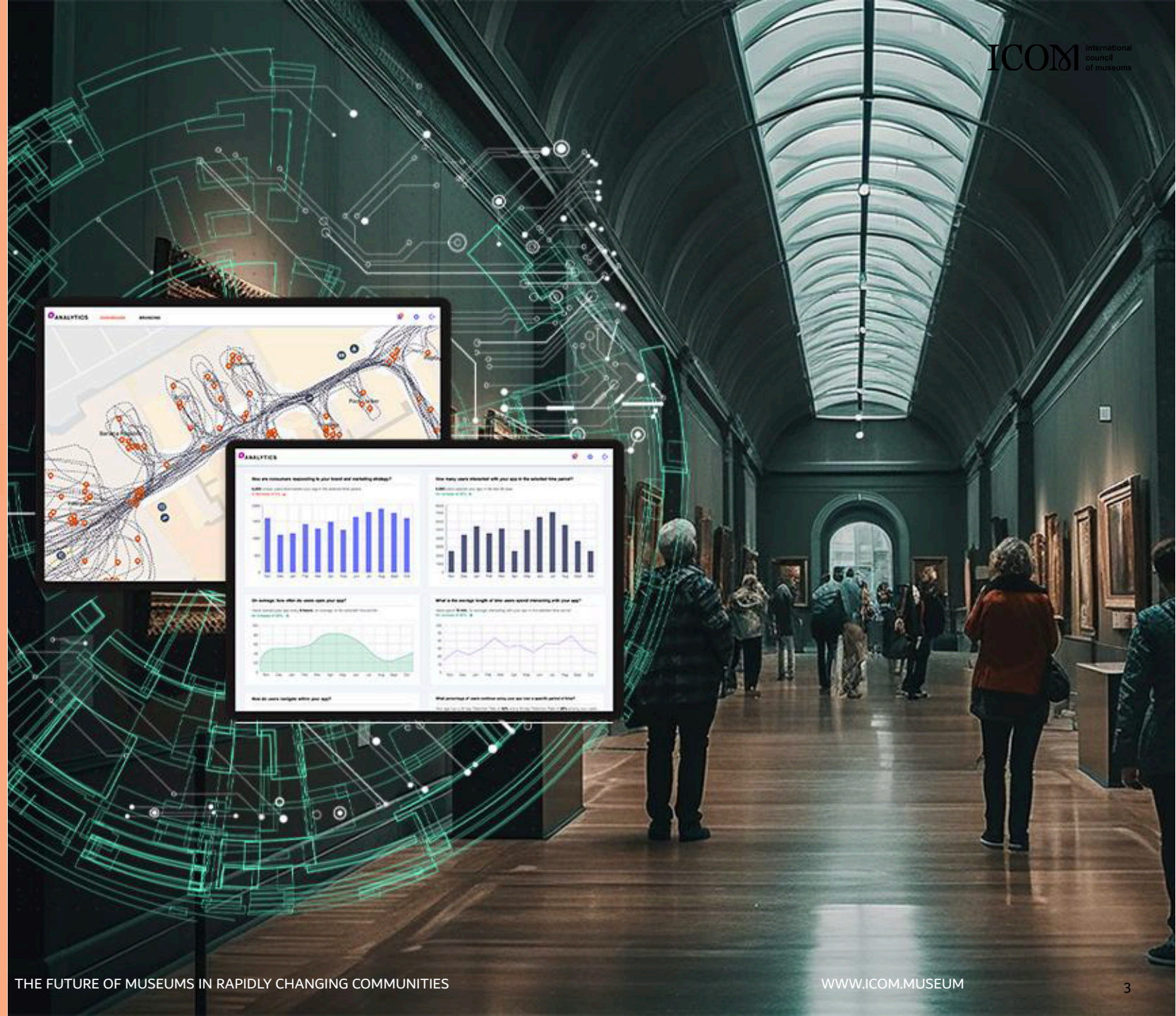
CHAPTER 2 - Case studies

CHAPTER 3 - Toolbox for museum professionals

CHAPTER 4 - Conclusion

01

ALGORITH MIC MUSEUM



“We no longer live online or offline but **onlife**, that is, we increasingly live in that special space, or **infosphere**, that is seamlessly analogue and digital, offline and online”

Luciano Floridi

Algorithmic museum

The contemporary museum is moving toward an a new ecosystem—onsite and online—where data and models mediate communication, interpretation, and operations.

Not just an app, but the whole pipeline:

data → models → interfaces → behaviours → feedback.

Data pipeline

data → consent / minimisation /representativeness

models → bias / filter bubbles

interfaces → dark patterns / privacy

behaviours → agency / equity

feedback → accountability / participation

Museum Data Landscape

A museum map of the data that shape experiences, operations, and public trust, organized into five equal domains.

- → Visitor Data
- → Collection Data
- → Operations Data
- → Communications & Marketing Data
- → Social & Community Data

Museum Data Landscape

Visitor Data → age, origin, dwell times, peaks hours

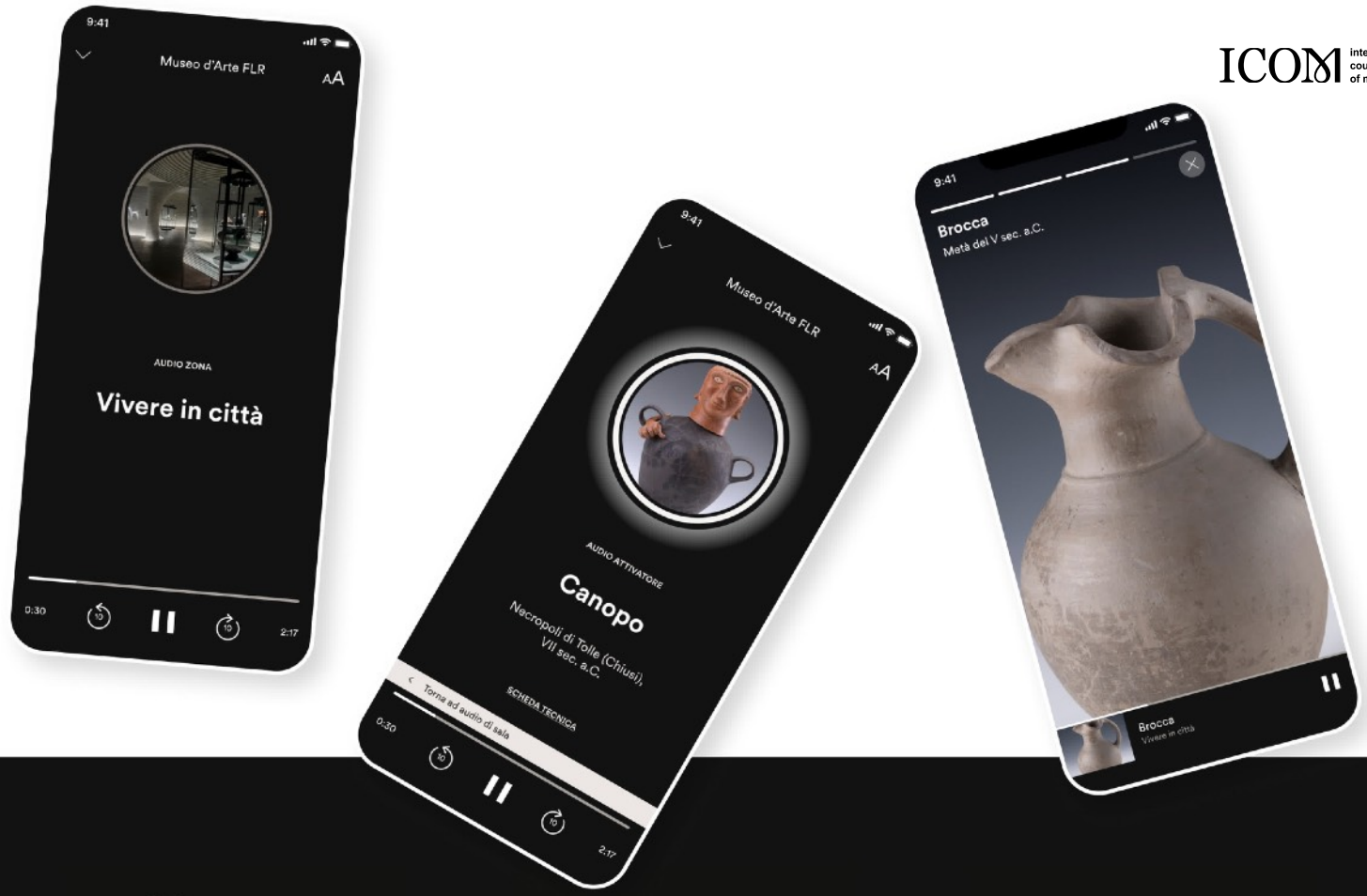
Collection Data → metadata, context, provenance, digital twins

Operations Data → visitor flow, energy/costs, logistic

Communications & Marketing Data → web analytics, campaign performance, email metrics

Social & Community Data → reviews, sentiment, community inputs

CASE STUDIES



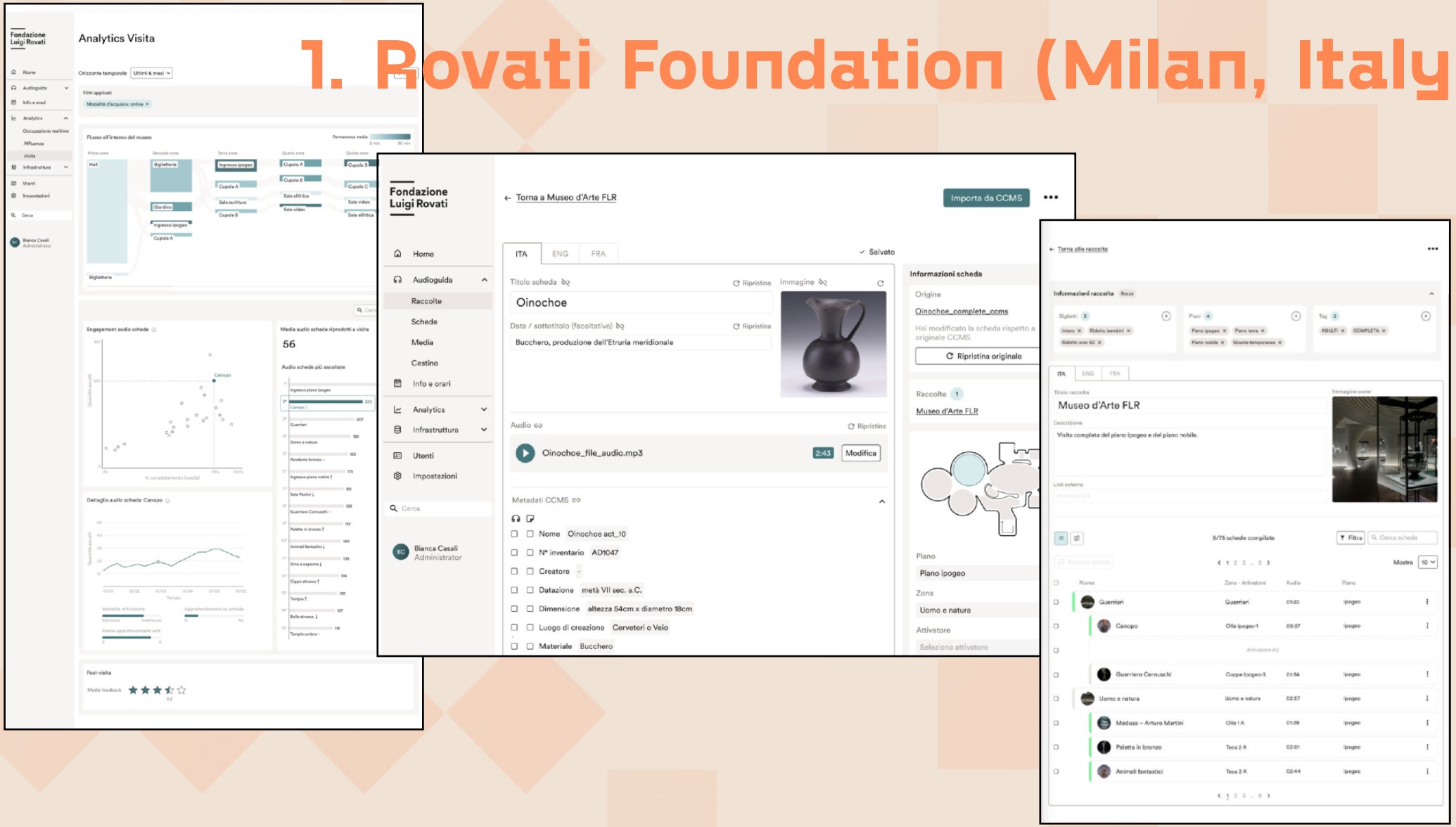
1. Rovati Foundation (Milan, Italy)

The solution adopted in this new historic museum in Milan couples **Digital User Experience** (visitor-facing) with **Digital Governance** (staff-facing), delivering a location-based audio guide that triggers content automatically via a beacon infrastructure.

1. Rovati Foundation (Milan, Italy)

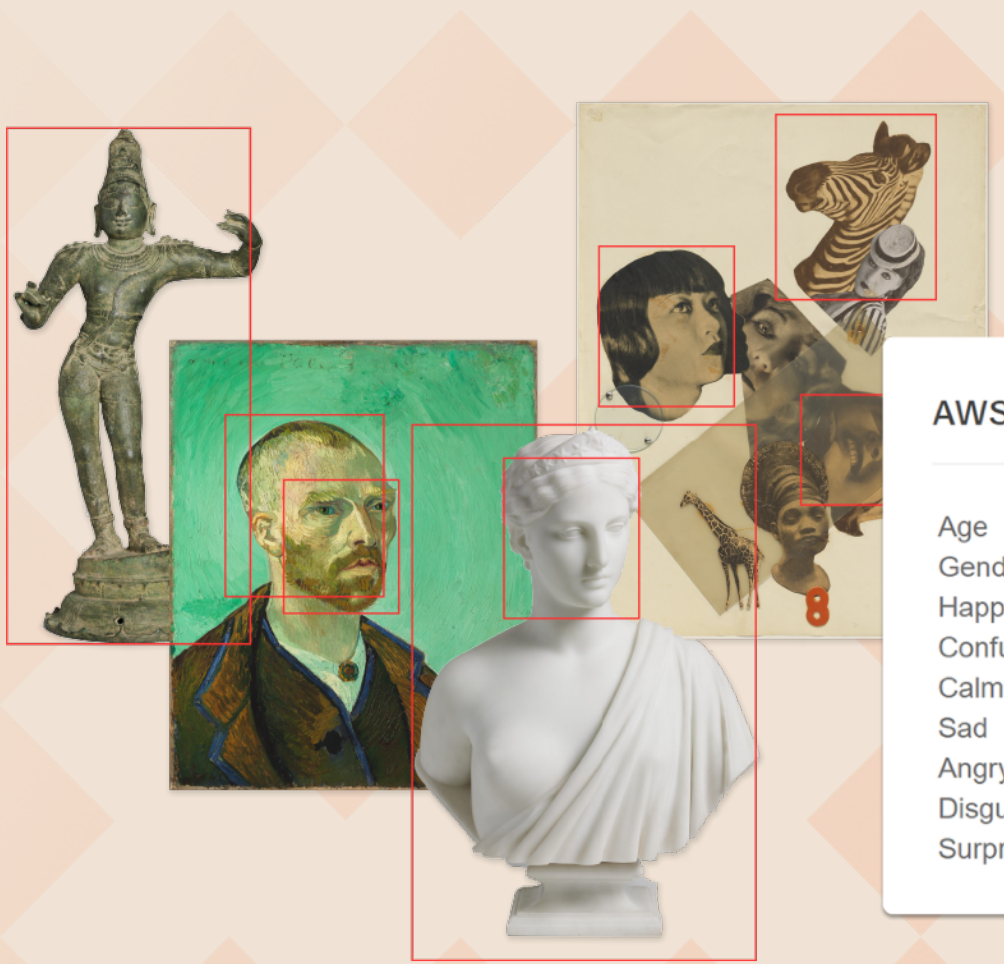
1. Rovati Foundation (Milan, Italy)

1. Rovati Foundation (Milan, Italy)



2. Harvard AI Explorer (Cambridge, US)

A **public web app** that lets you search and **compare machine-generated annotations for collection images** (tags, captions, faces, detected text, coarse categories), compiled from multiple commercial computer-vision and multimodal LLM services.



AWS Rekognition

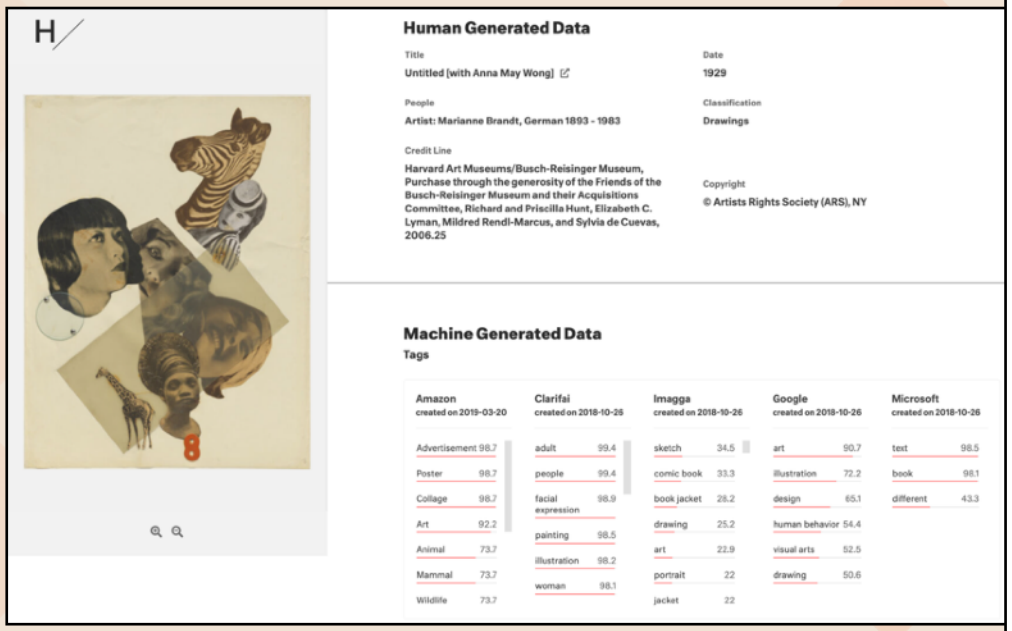
Age	35-
Gender	Male, 79.8%
Happy	0.4%
Confused	3.9%
Calm	60.8%
Sad	30.3%
Angry	3.1%
Disgusted	0.7%
Surprised	0.8%

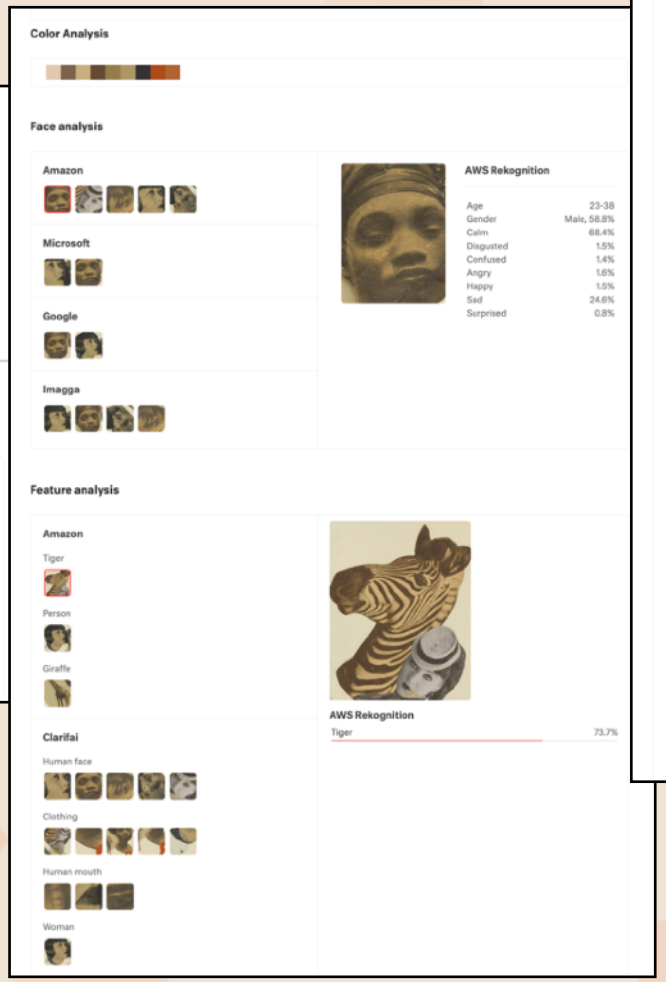
Microsoft

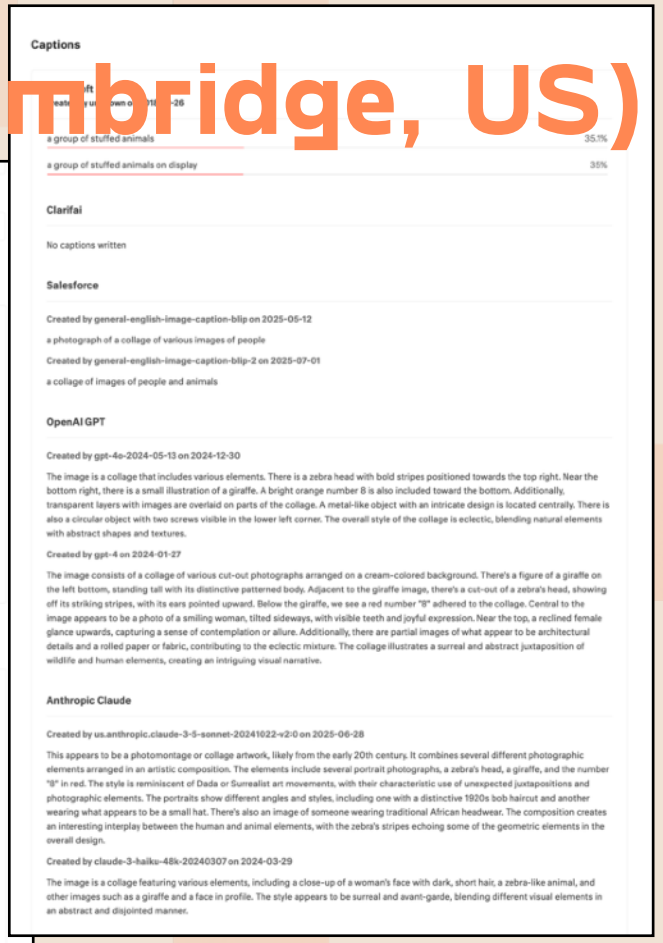
a painting of a snow covered ground	53.6 %
a painting of a snow covered mountain	51.5 %
a painting in the snow	41.7 %

2. Harvard AI Explorer (Cambridge, US)

2. Harvard AI Explorer (Cambridge, US)



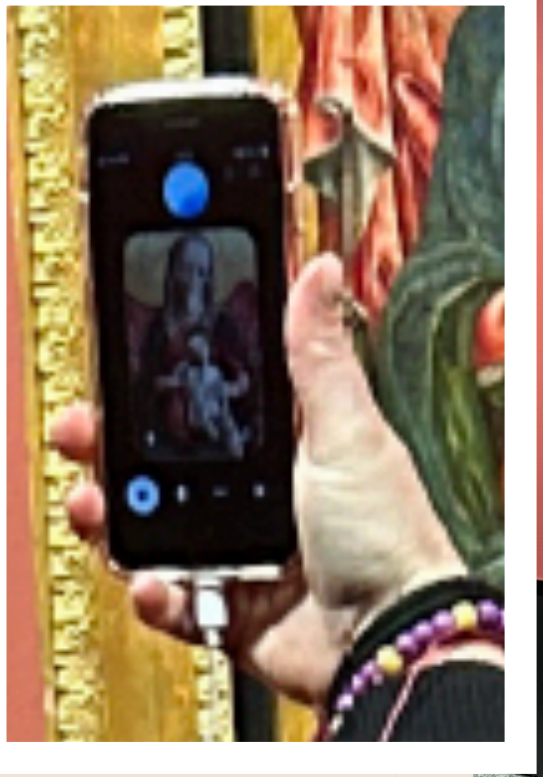




3. Accademia Carrara (Bergamo, Italy)

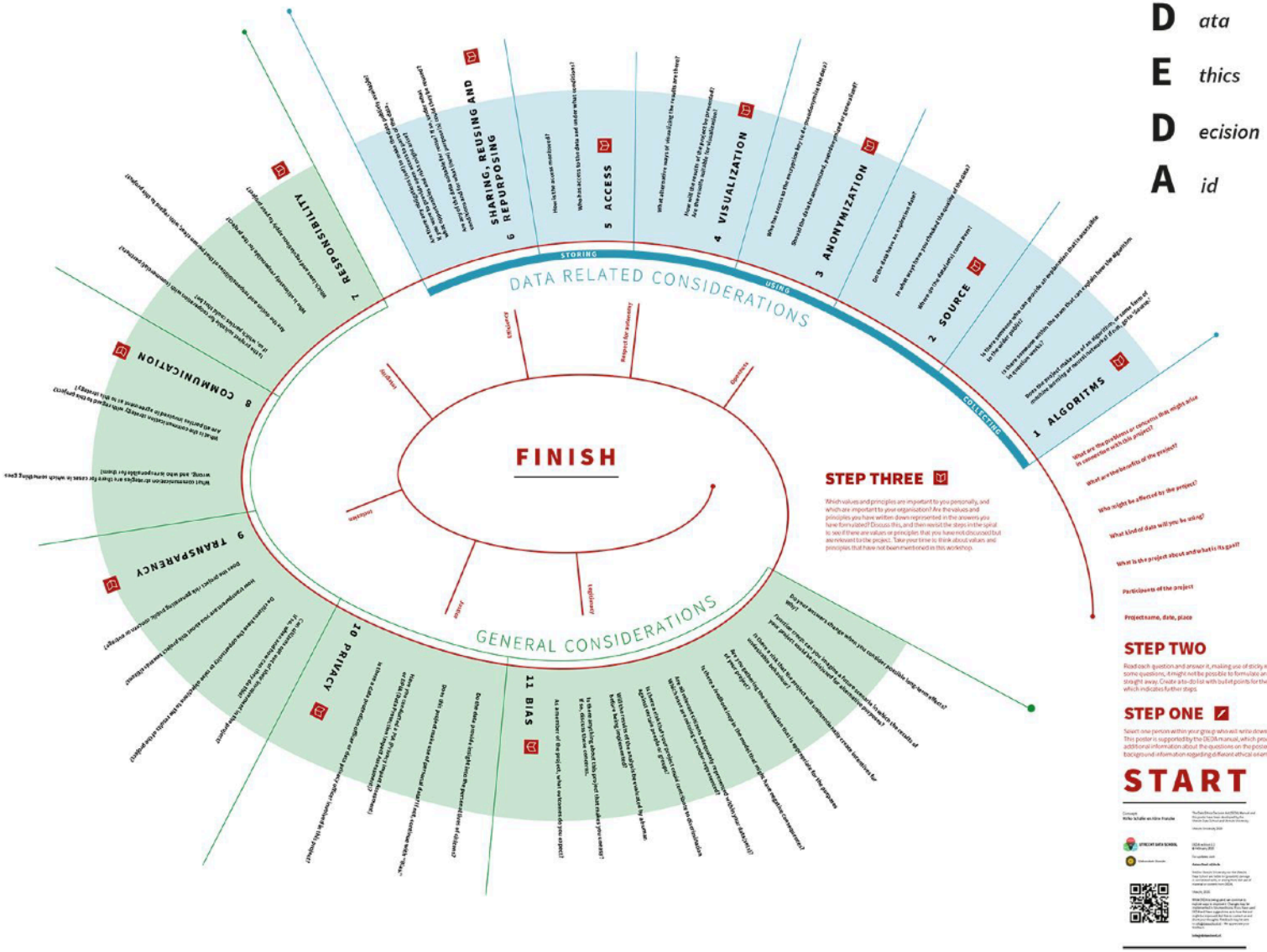
A field research to investigate the application of an **advanced voice-based AI**—specifically ChatGPT in interactive mode—as an innovative **audioguide tool** to enhance visitor engagement within museum settings.

3. Accademia Carrara (Bergamo, Italy)



3. Accademia Carrara (Bergamo, Italy)

TOOLBOX FOR MUSEUM PROFESSIONALS



1. SAFE-D principles

A practical, lifecycle framework for responsible AI/data projects that embeds ethics from design → development → deployment.

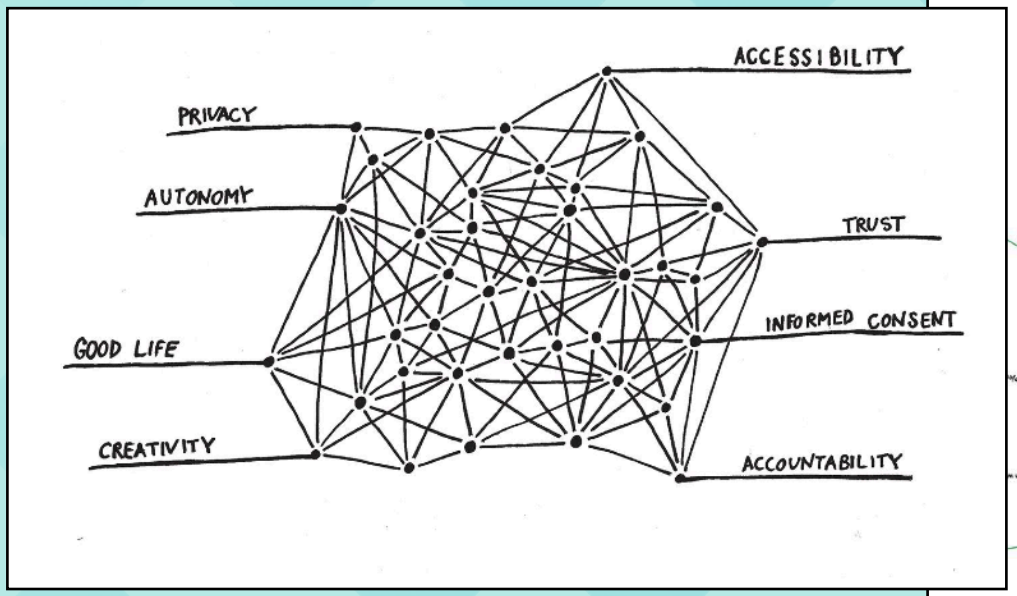
Centered on **Sustainability, Accountability, Fairness, Explainability, and Data Responsibility**, it operationalises ethics through phase-specific checklists, risk registers, model cards, and clear decision gates with human oversight.

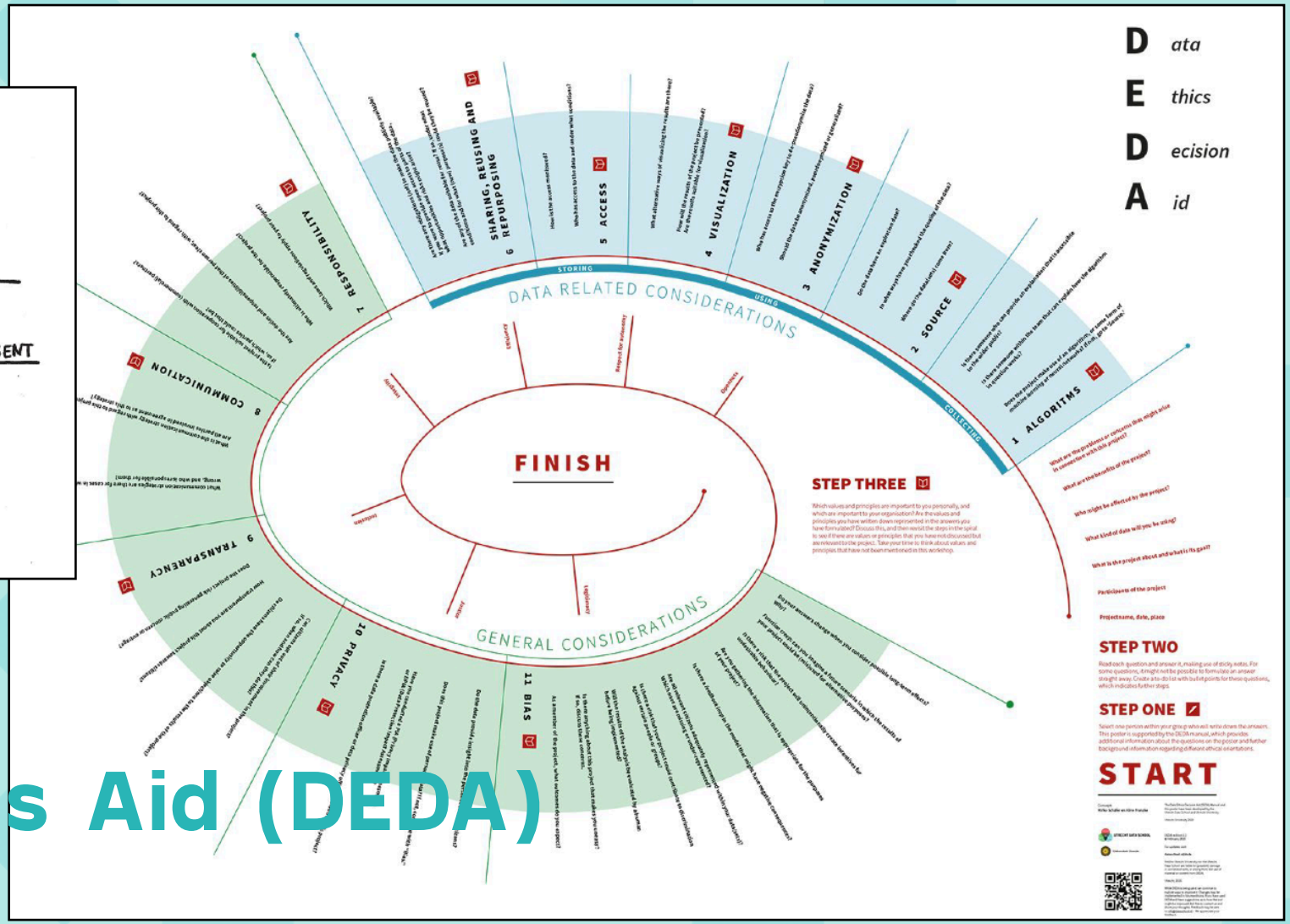
1. SAFE-D principles

2. Data Ethics Aid (DEDA)

An handbook that **helps to identify ethical issues and to develop a sense for value conflicts** within a data project.

DEDA could help to create insight in the public values that are affected, or to document the ethical decision making process.





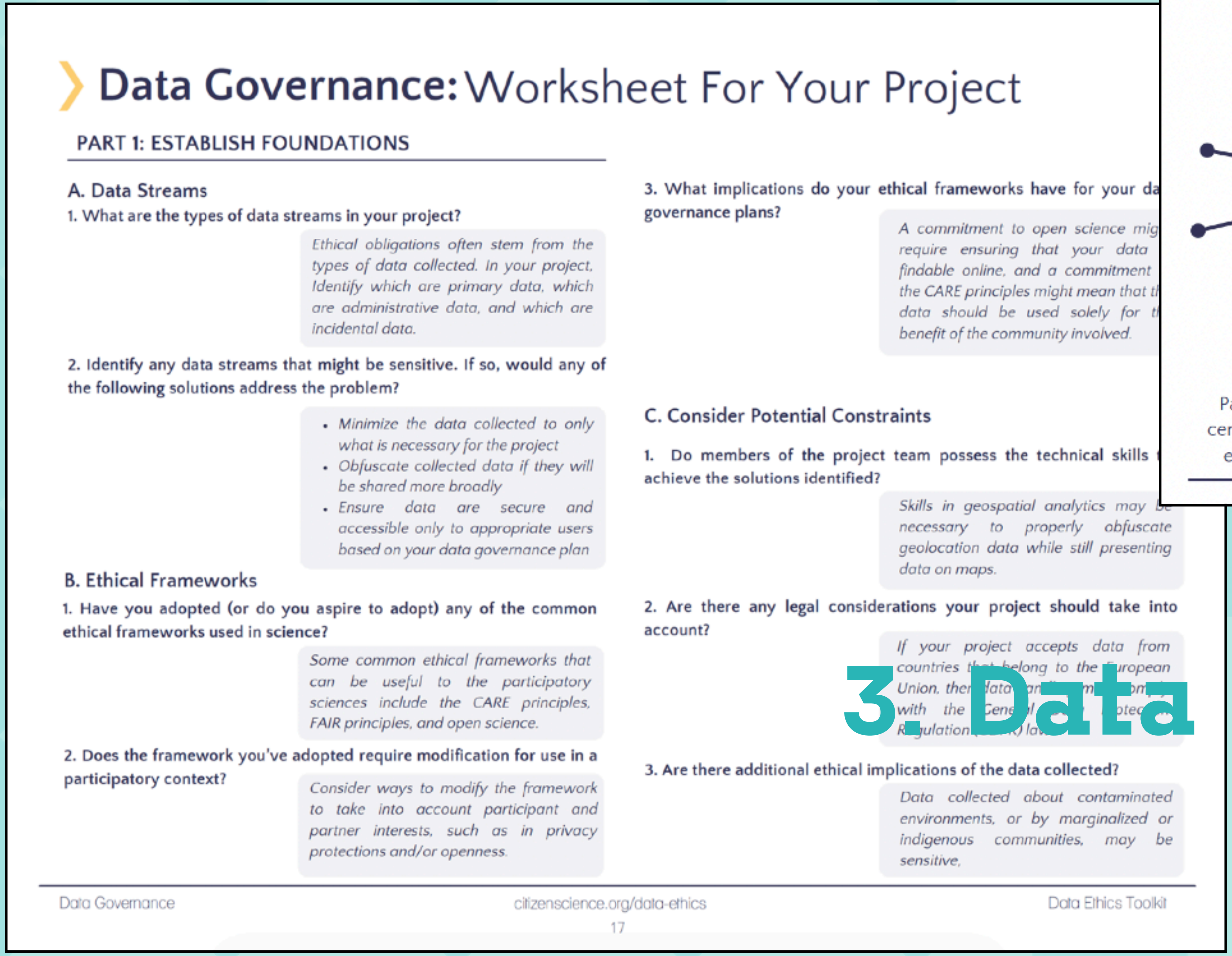
2. Data Ethics Aid (DEDA)

3. Data Ethics Toolkit

A collaboratively developed, living resource for citizen & community science that centers data ethics across the whole project lifecycle.

An instrument especially designed for institution-led ("top-down") projects with centralized data stewardship.

3. Data Ethics Toolkit



Data Governance: Worksheet For Your Project

PART 1: ESTABLISH FOUNDATIONS

A. Data Streams

1. What are the types of data streams in your project?

Ethical obligations often stem from the types of data collected. In your project, identify which are primary data, which are administrative data, and which are incidental data.

2. Identify any data streams that might be sensitive. If so, would any of the following solutions address the problem?

- *Minimize the data collected to only what is necessary for the project*
- *Obfuscate collected data if they will be shared more broadly*
- *Ensure data are secure and accessible only to appropriate users based on your data governance plan*

B. Ethical Frameworks

1. Have you adopted (or do you aspire to adopt) any of the common ethical frameworks used in science?

Some common ethical frameworks that can be useful to the participatory sciences include the CARE principles, FAIR principles, and open science.

2. Does the framework you've adopted require modification for use in a participatory context?

Consider ways to modify the framework to take into account participant and partner interests, such as in privacy protections and/or openness.

3. What implications do your ethical frameworks have for your da[ta] governance plans?

A commitment to open science mig[ht] require ensuring that your data [is] findable online, and a commitment [to] the CARE principles might mean that t[he] data should be used solely for t[he] benefit of the community involved.

C. Consider Potential Constraints

1. Do members of the project team possess the technical skills [to] achieve the solutions identified?

Skills in geospatial analytics may be necessary to properly obfuscate geolocation data while still presenting data on maps.

2. Are there any legal considerations your project should take into account?

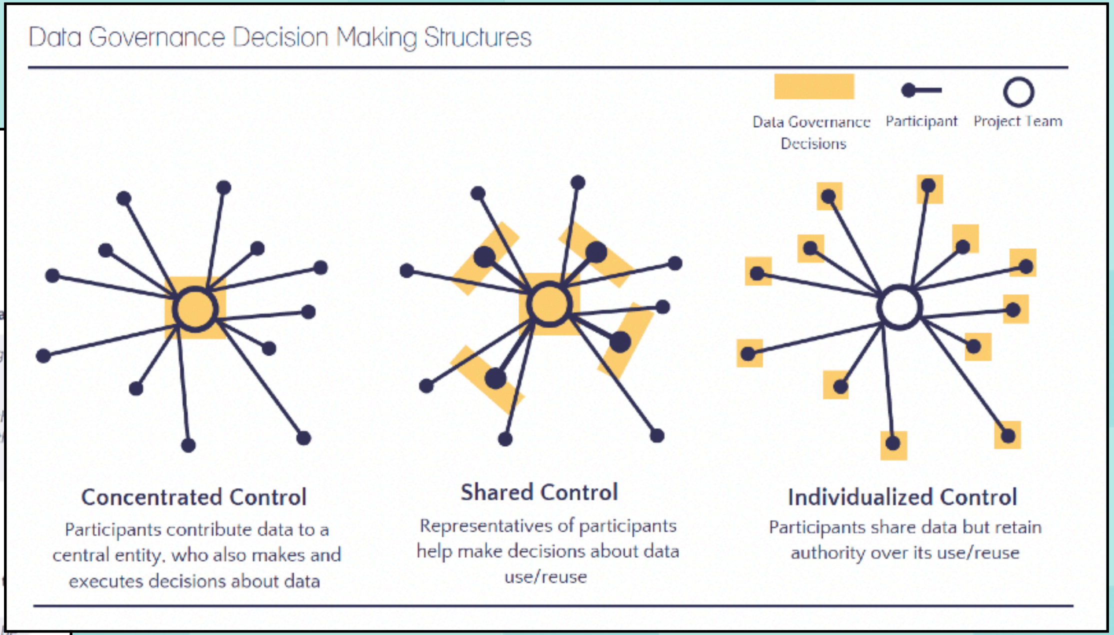
If your project accepts data from countries that belong to the European Union, then data ... with the General ... Regulation (GDPR) la[ws]...

3. Are there additional ethical implications of the data collected?

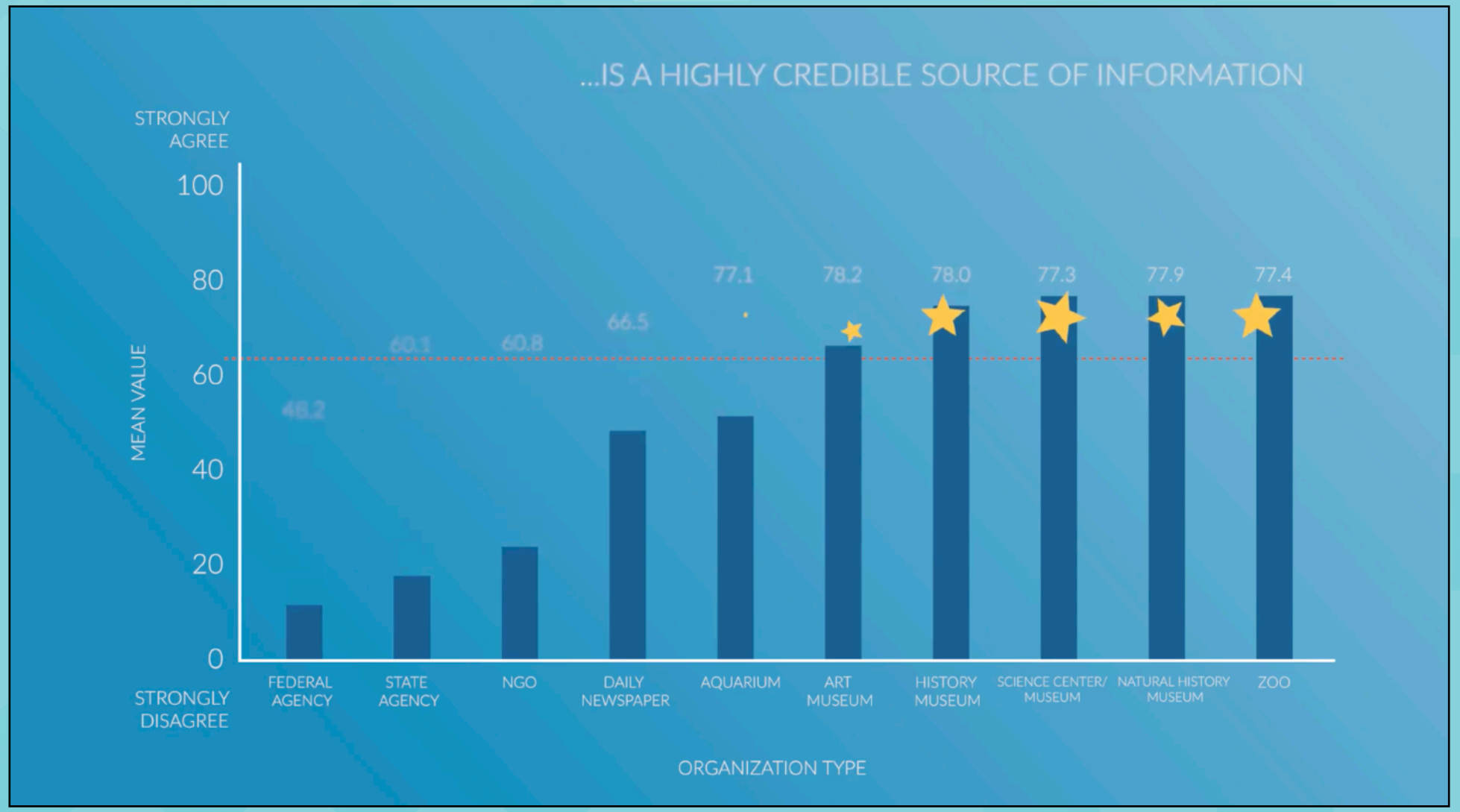
Data collected about contaminated environments, or by marginalized or indigenous communities, may be sensitive.

Data Governance | citizenscience.org/data-ethics | Data Ethics Toolkit

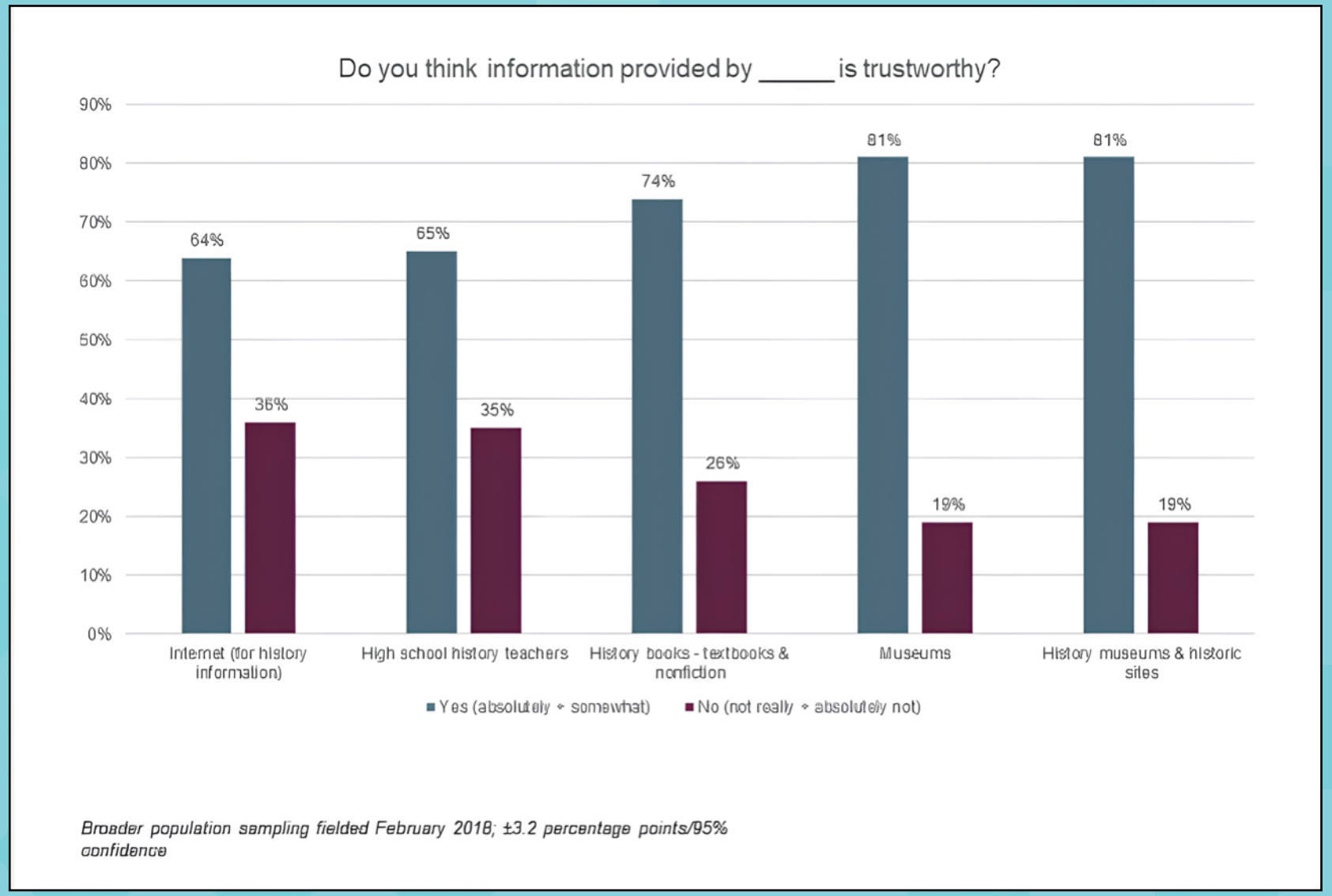
17



CONCLUSION



Credible source of information, IMPACTS Experience, Colleen Dilenschneider, US, 2019.



Informations trustability, Wilkening Consulting, US, 2019.

"AAM's research has found as recently as January 2025 that **the public continues to view museums as highly trustworthy—second only to friends and family**, and significantly higher than researchers and scientists, news organizations, and the government."

Marilyn Jackson

THANK YOU

The Algorithmic Museum: Personalized Engagement and Ethical Implications

20-11

Ph.D. Manuel Scortichini