

The Algorithmic Museum: Personalized Engagement and Ethical Implications

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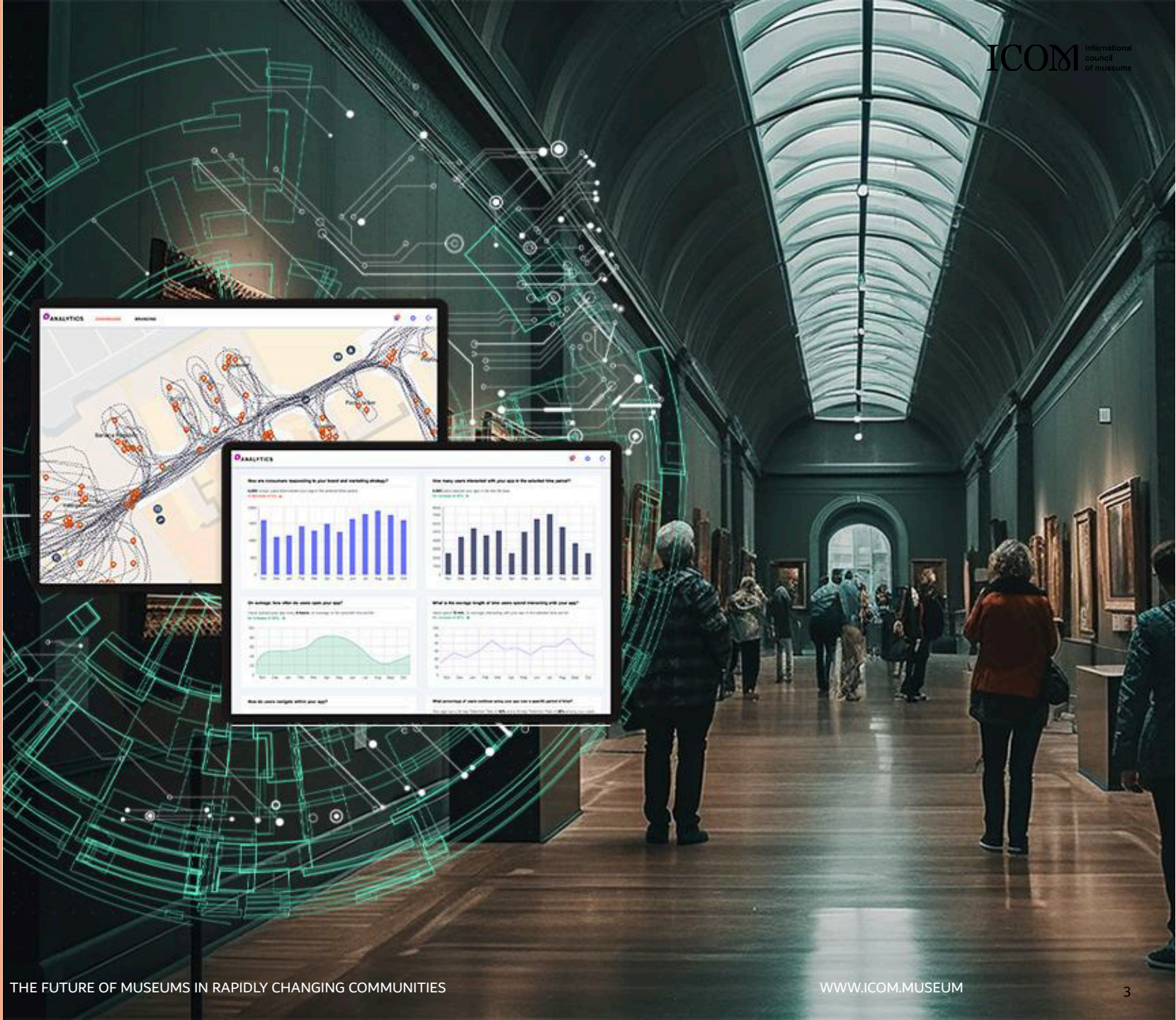
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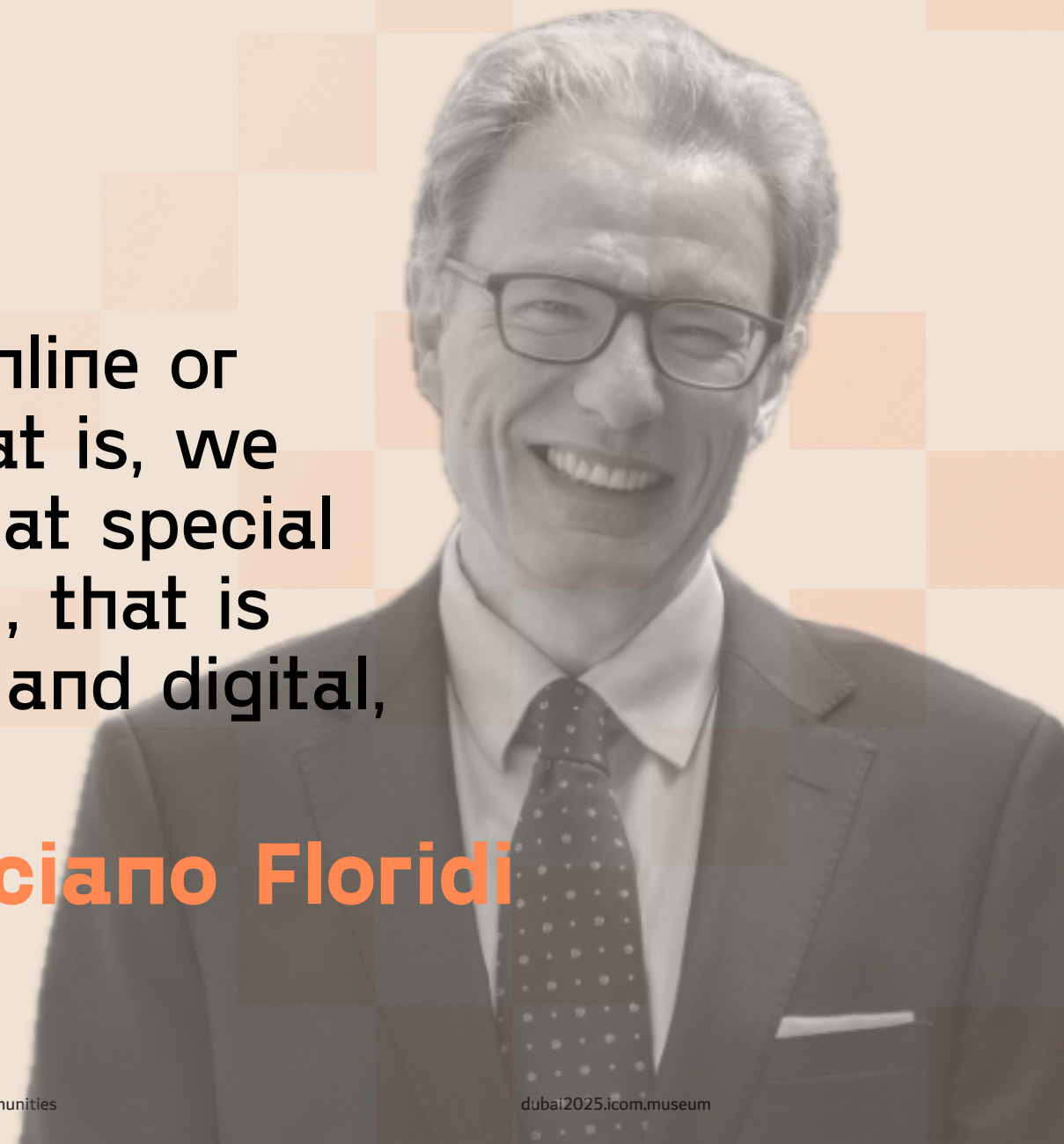
01

ALGORITHMIC 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

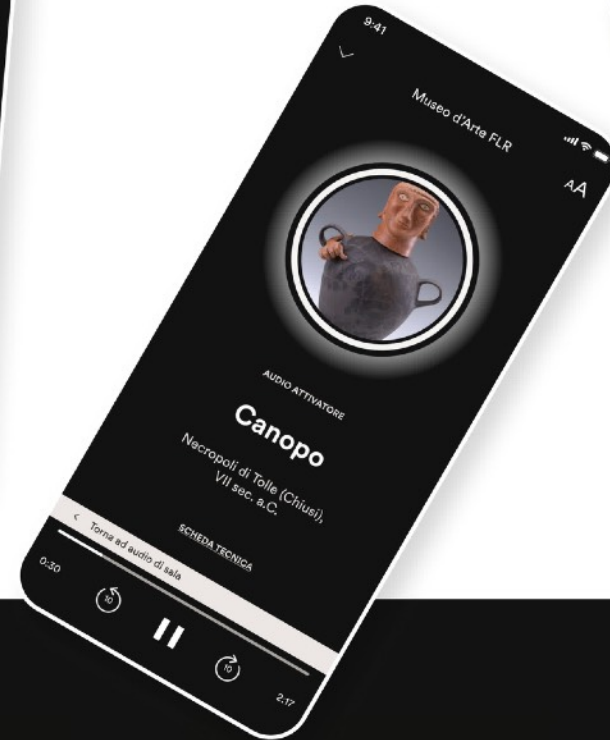
Operations Data → visitor flow, energy/costs, logistic

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

Social & Community Data → reviews, sentiment, community inputs

02

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.

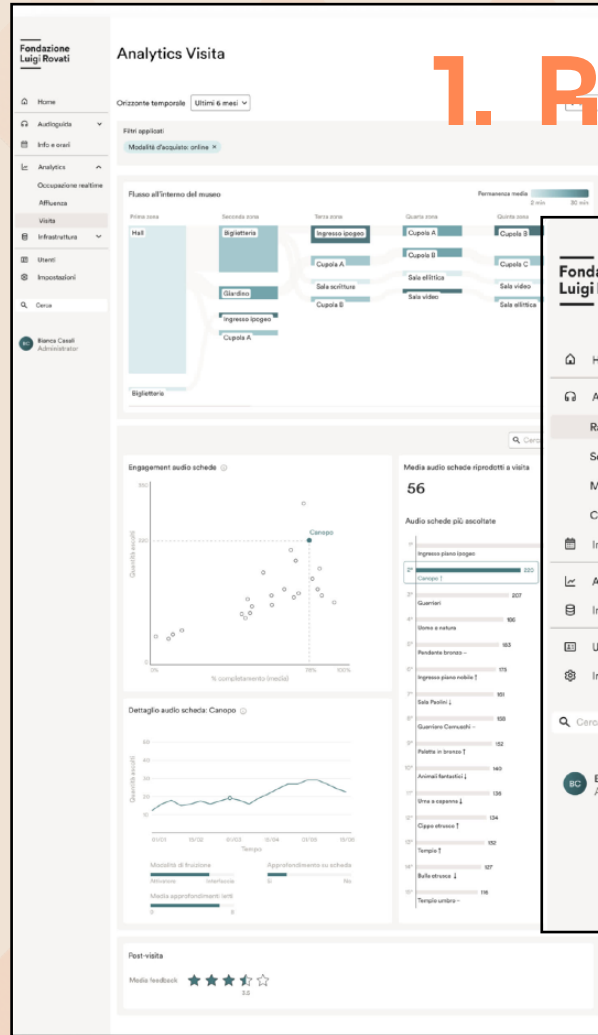
1. Rovati Foundation (Milan, Italy)





1. Rovati Foundation (Milan, Italy)

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Fondazione Luigi Rovati

Home | Audioguida | Raccolte | Schede | Media | Cestino | Info e orari | Analytics | Infrastruttura | Utenti | Impostazioni

Bianca Casali Administrator

← Torna a Museo d'Arte FLR

Importa da CCMS

ITA ENG FRA

Titolo scheda: **Oinochoe**

Data / sottotitolo (facoltativo): **Bucchero, produzione dell'Etruria meridionale**

Immagine

Audio

Oinochoe_file_audio.mp3

Metadati CCMS

Nome: Oinochoe act_10

N° inventario: AD1047

Creazione: metà VII sec. a.C.

Dimensione: altezza 54cm x diametro 18cm

Luogo di creazione: Cerveteri o Veio

Materiale: Bucchero

Informazioni scheda

Origine: **Oinochoe_complete_ccms**

Hai modificato la scheda rispetto a originale CCMS

Ripristina originale

Raccolte: **Museo d'Arte FLR**

Piano: **Piano ipogeo**

Zona: **Uomo e natura**

Attivatore: **Selezione attivatore**

← Torna alla raccolta

Informazioni raccolta: **Basse**

Rigetti: 3

Parole: 4

Tag: 2

ABILI: COMPLETA

ITA ENG FRA

Titolo raccolta: **Museo d'Arte FLR**

Descrizione: **Visita completa del piano ipogeo e del piano nobile.**

Link esterni

8/75 schede complete

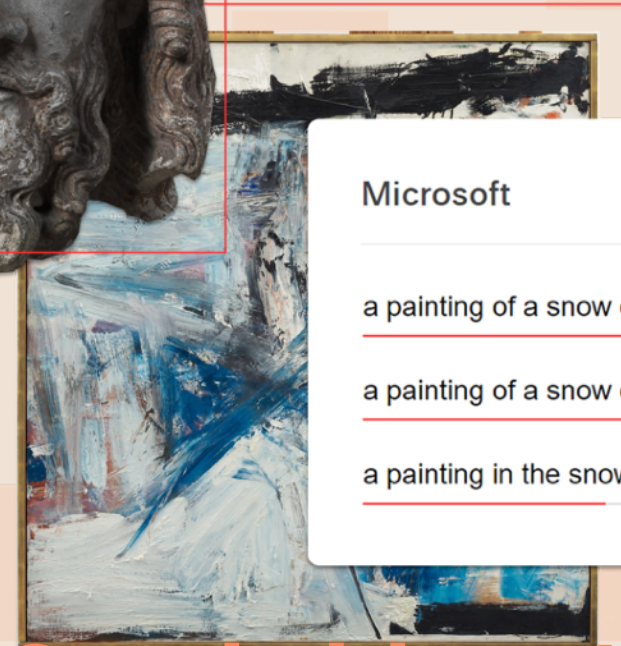
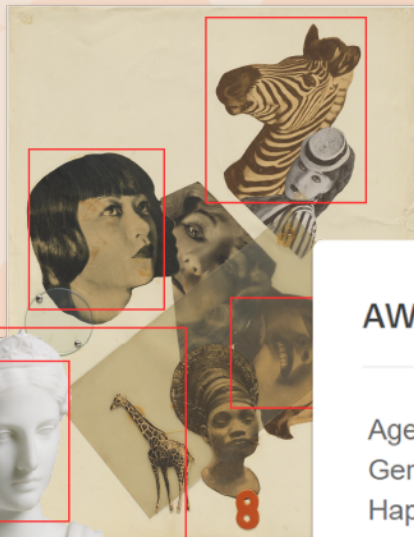
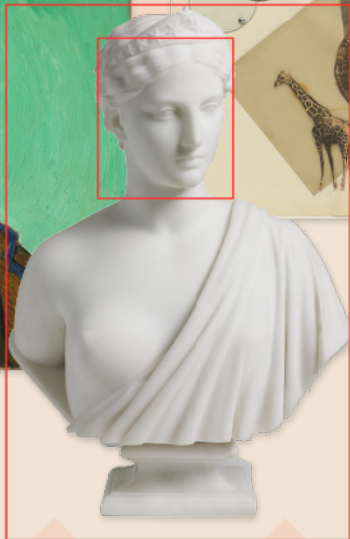
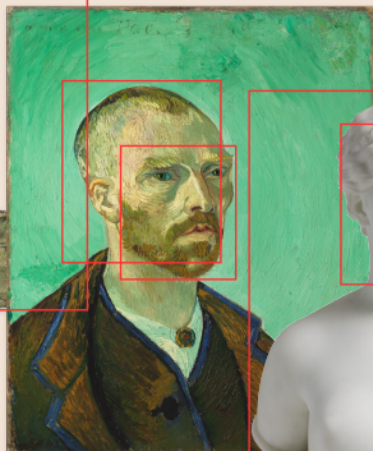
Filtra

Cerca scheda

Nome	Zona - Attivatore	Audio	Piano
Guernieri	Guernieri	01:20	ipogeo
Canopo	Olla ipogeo-1	00:07	ipogeo
Guernieri Cerveteri	Croce ipogeo-3	01:34	ipogeo
Uomo e natura	Uomo e natura	02:27	ipogeo
Madusa - Arturo Martini	Olla 1 A	01:38	ipogeo
Paletta in bronzo	Teca 2 A	02:01	ipogeo
Animali fantastici	Teca 3 A	02:44	ipogeo

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)

Human Generated Data

Title
Untitled [with Anna May Wong]

Date
1929

People
Artist: Marianne Brandt, German 1893 - 1983

Classification
Drawings

Credit Line
Harvard Art Museums/Busch-Reisinger Museum, Purchase through the generosity of the Friends of the Busch-Reisinger Museum and their Acquisitions Committee, Richard and Priscilla Hunt, Elizabeth C. Lyman, Mildred Rendt-Marcus, and Sylvia de Cuevas, 2006.25

Copyright
© Artists Rights Society (ARS), NY

Machine Generated Data

Tags

Amazon created on 2019-03-20	Clarifai created on 2018-10-25	Imagga created on 2018-10-26	Google created on 2018-10-26	Microsoft created on 2018-10-26
Advertisement 98.7	adult 99.4	sketch 34.5	art 90.7	text 98.5
Poster 98.7	people 99.4	comic book 33.3	illustration 72.2	book 98.1
Collage 98.7	facial expression 98.9	book jacket 28.2	design 65.1	different 43.3
Art 92.2	painting 98.5	drawing 25.2	human behavior 54.4	
Animal 73.7	illustration 98.2	art 22.9	visual arts 52.5	
Mammal 73.7	woman 98.1	portrait 22	drawing 50.6	
Wildlife 73.7		jacket 22		

Color Analysis

Face analysis

Amazon

Microsoft

Google

Imagga

AWS Rekognition

Age 23-38
Gender Male, 58.8%
Calm 68.4%
Disgusted 1.5%
Confused 1.4%
Angry 1.6%
Happy 1.5%
Sad 24.6%
Surprised 0.8%

Feature analysis

Amazon

Tiger

Person

Giraffe

Clarifai

Human face

Clothing

Human mouth

Woman

AWS Rekognition

Tiger

73.7%

Captions

ask you own o 11-26

a group of stuffed animals 35.1%

a group of stuffed animals on display 35%

Clarifai

No captions written

Salesforce

Created by general-english-image-caption-blip on 2025-05-12

a photograph of a collage of various images of people

Created by general-english-image-caption-blip-2 on 2025-07-01

a collage of images of people and animals

OpenAI GPT

Created by gpt-4o-2024-05-13 on 2024-12-30

The image is a collage that includes various elements. There is a zebra head with bold stripes positioned towards the top right. Near the bottom right, there is a small illustration of a giraffe. A bright orange number 8 is also included toward the bottom. Additionally, transparent layers with images are overlaid on parts of the collage. A metal-like object with an intricate design is located centrally. There is also a circular object with two screws visible in the lower left corner. The overall style of the collage is eclectic, blending natural elements with abstract shapes and textures.

Created by gpt-4o on 2024-01-27

The image consists of a collage of various cut-out photographs arranged on a cream-colored background. There's a figure of a giraffe on the left bottom, standing tall with its distinctive patterned body. Adjacent to the giraffe image, there's a cut-out of a zebra's head, showing off its striking stripes, with its ears pointed upward. Below the giraffe, we see a red number "8" adhered to the collage. Central to the image appears to be a photo of a smiling woman, tilted sideways, with visible teeth and joyful expression. Near the top, a reclined female glance upwards, capturing a sense of contemplation or allure. Additionally, there are partial images of what appear to be architectural details and a rolled paper or fabric, contributing to the eclectic mixture. The collage illustrates a surreal and abstract juxtaposition of wildlife and human elements, creating an intriguing visual narrative.

Anthropic Claude

Created by us.anthropic.claude-3-5-sonnet-20241022-v2:0 on 2025-06-28

This appears to be a photomontage or collage artwork, likely from the early 20th century. It combines several different photographic elements arranged in an artistic composition. The elements include several portrait photographs, a zebra's head, a giraffe, and the number "8" in red. The style is reminiscent of Dada or Surrealist art movements, with their characteristic use of unexpected juxtapositions and photographic elements. The portraits show different angles and styles, including one with a distinctive 1920s bob haircut and another wearing what appears to be a small hat. There's also an image of someone wearing traditional African headwear. The composition creates an interesting interplay between the human and animal elements, with the zebra's stripes echoing some of the geometric elements in the overall design.

Created by claude-3-haiku-48k-20240307 on 2024-03-29

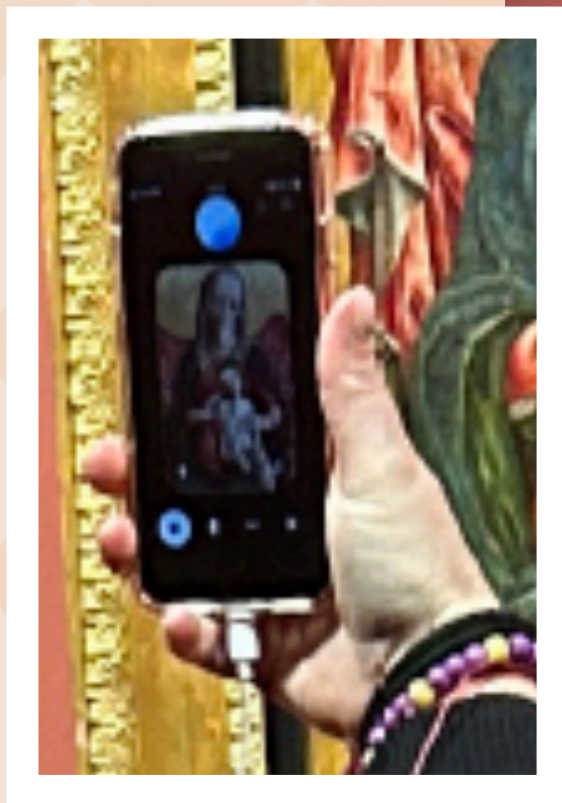
The image is a collage featuring various elements, including a close-up of a woman's face with dark, short hair, a zebra-like animal, and other images such as a giraffe and a face in profile. The style appears to be surreal and avant-garde, blending different visual elements in an abstract and disjointed manner.

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 PROFESSIO NALS



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



Achieving this goal requires assuring AI projects being developed with continuous sensitivity to real-world impacts.



Achieving this goal requires an AI system to be technically accurate, reliable, secure, and robust.



Achieving this goal requires assuring projects' end-to-end answerability and auditability.



Achieving this goal requires assuring a minimum threshold of discriminatory non-harm and bias mitigation.



Achieving this goal requires the ability to explain and justify AI project processes and AI-supported outcomes.

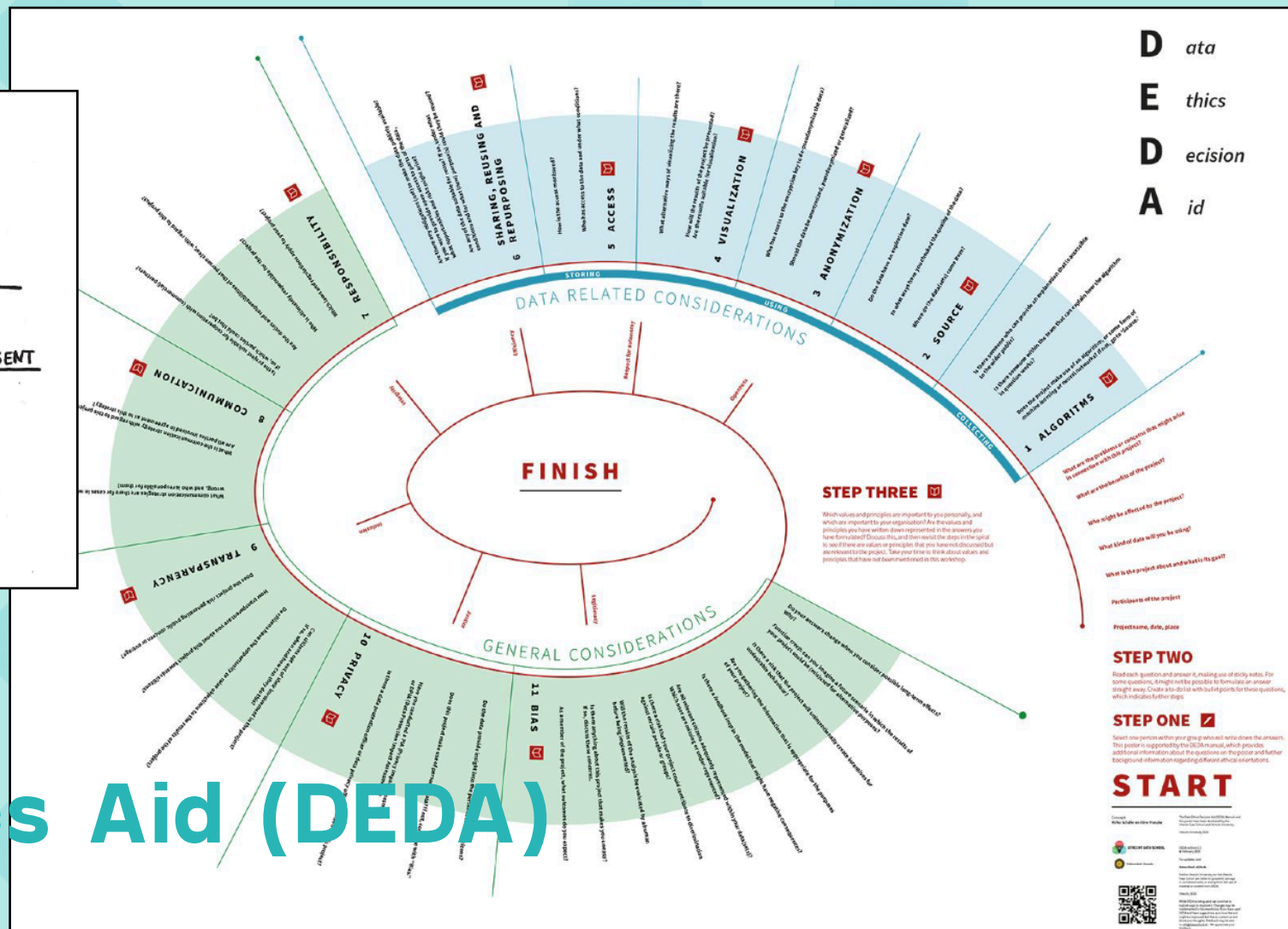


Achieving this goal requires data quality, integrity, protection, and privacy to be assured.

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.

> 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 data governance plans?

A commitment to open science might require ensuring that your data is findable online, and a commitment to the CARE principles might mean that the data should be used solely for the 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.

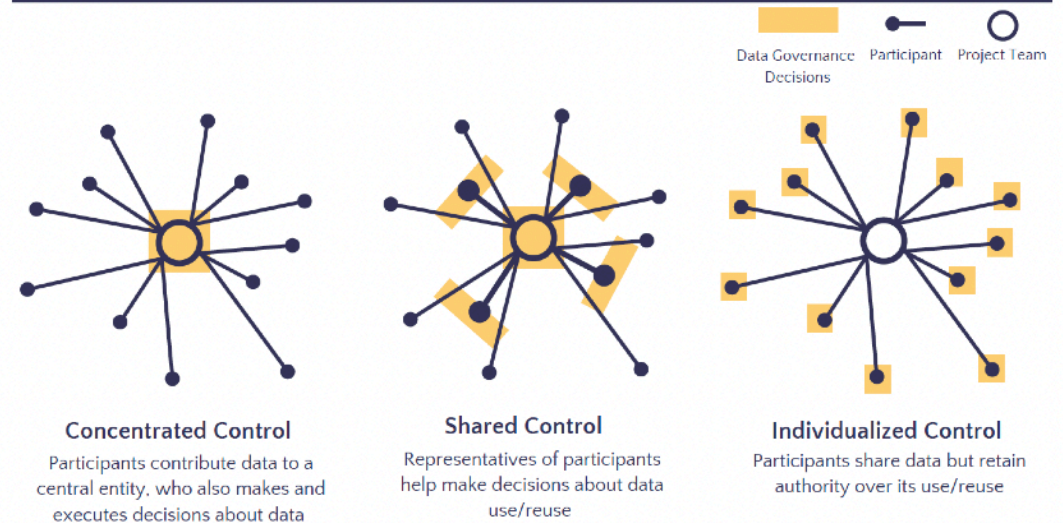
2. Are there any legal considerations your project should take into account?

If your project accepts data from countries that belong to the European Union, then data protection laws, such as the General Data Protection Regulation (GDPR), may apply.

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

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

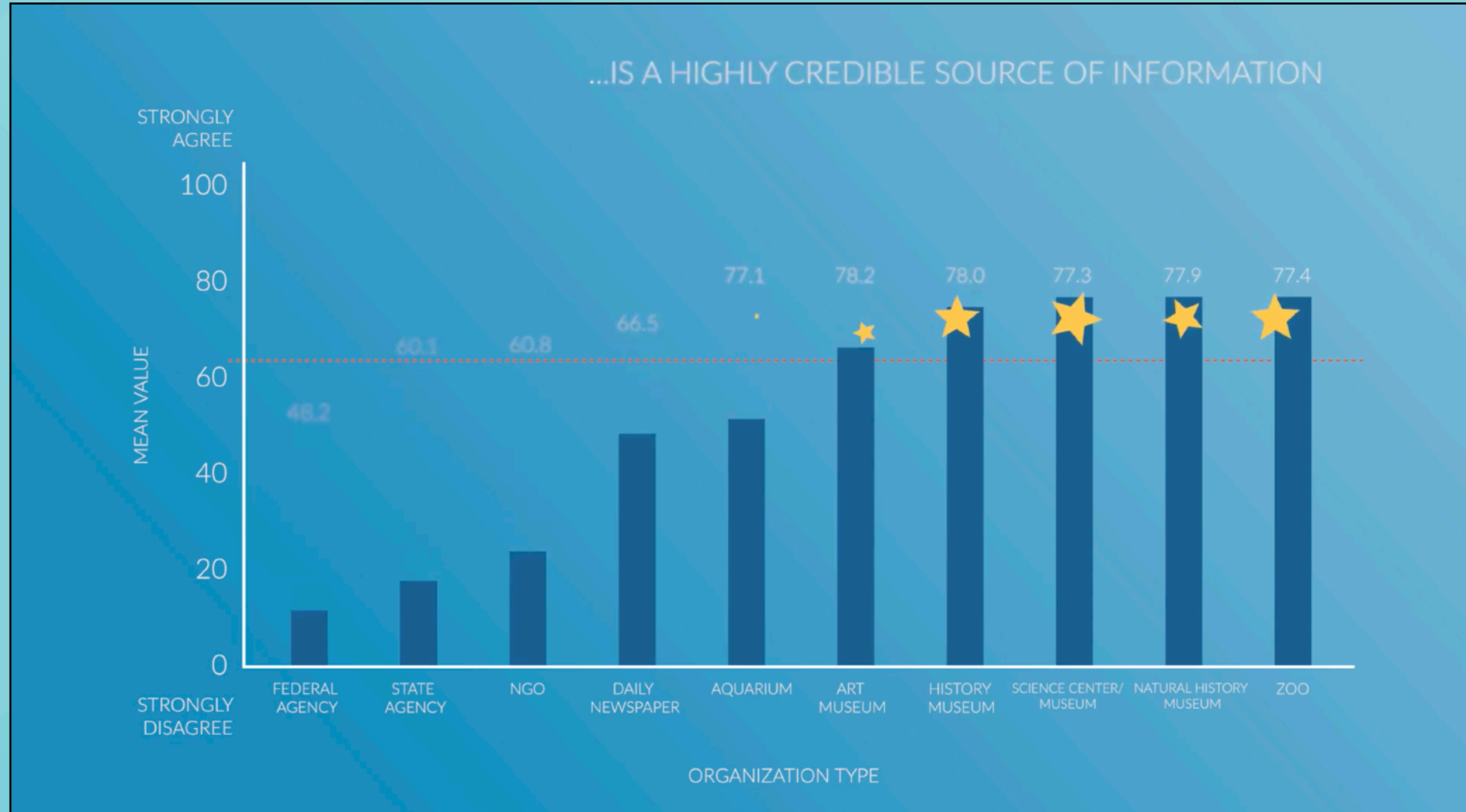
Data Governance Decision Making Structures



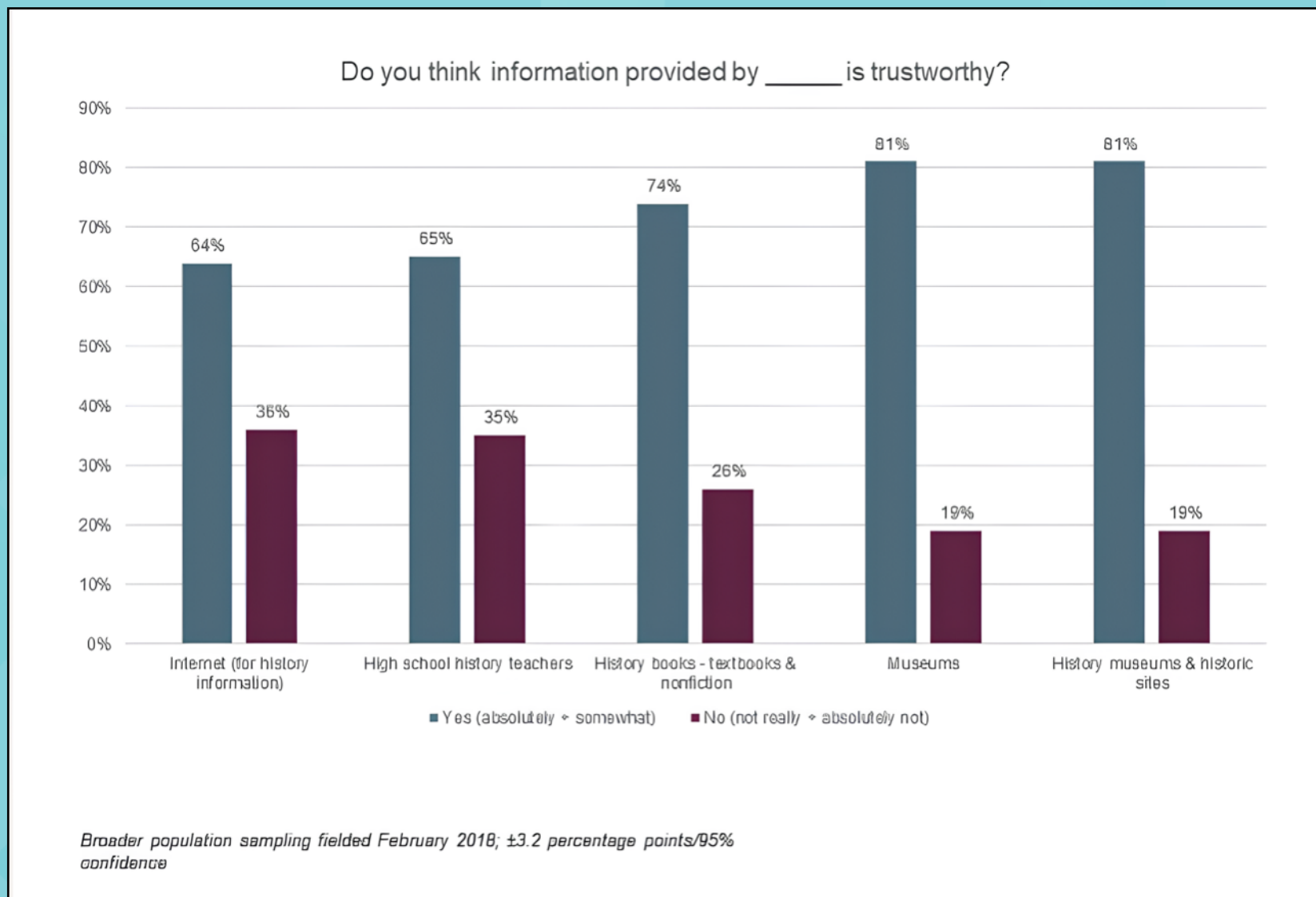
3. Data Ethics Toolkit

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

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