# AI
# Promises & Perils for the Information Ecosystem

**eBUG**
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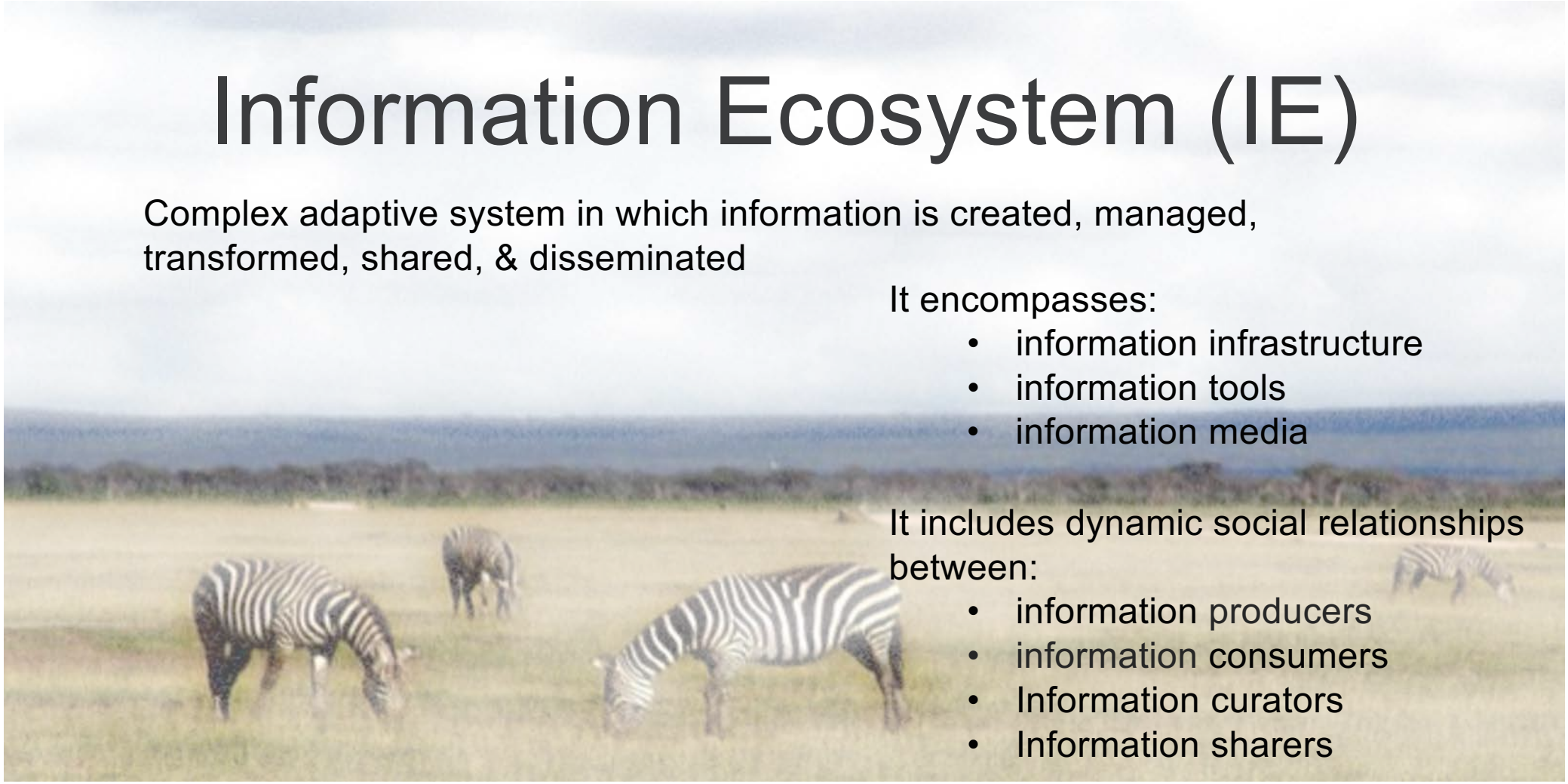
Chapter One

# Setting the Stage

# Information Ecosystem (IE)



Complex adaptive system in which information is created, managed, transformed, shared, & disseminated

It encompasses:

- information infrastructure
- information tools
- information media

It includes dynamic social relationships between:

- information producers
- information consumers
- Information curators
- Information sharers

# Elements of IE

**Organizations & Society**

- Physical & institutional infrastructure
- Trust networks around information
- Influencers who shape the information landscape

**The User**

- Information needs
- Information use

**The Information**

- Production
- Flow
- Access
- Impact

https://commons.wikimedia.org/w/index.php?search=ecosystem&title=Special:MediaSearch&go=Go&type=image

# Example of IE Map

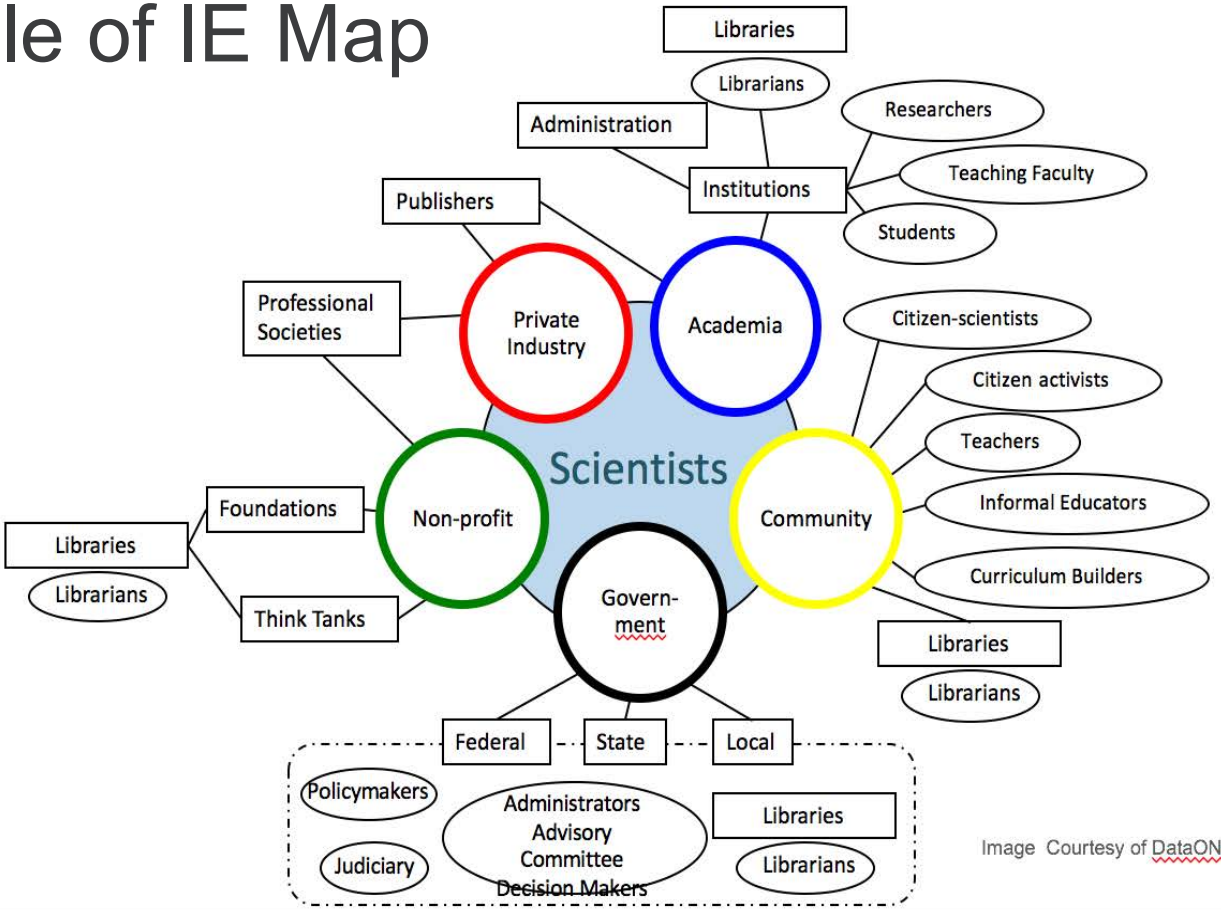



Image Courtesy of DataONE

# Knowing the IE helps you…

Listen to your community

what information they need, use, communicate

Understand the challenges

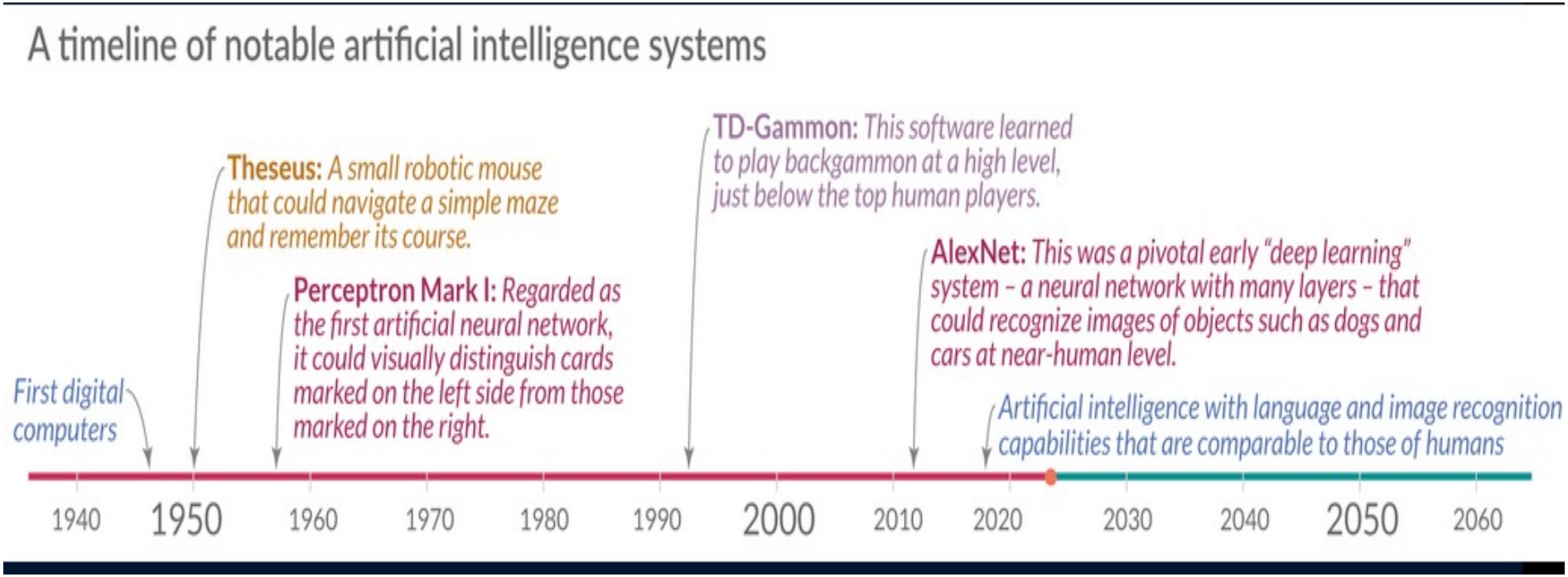
that exist and how you can address them

Design strategies

that support information creation, use, and dissemination

"Artificial intelligence is a field of science concerned with building computers and machines that can reason, learn, and act in such a way that would normally require human intelligence or that involves data whose scale exceeds what humans can analyze.."

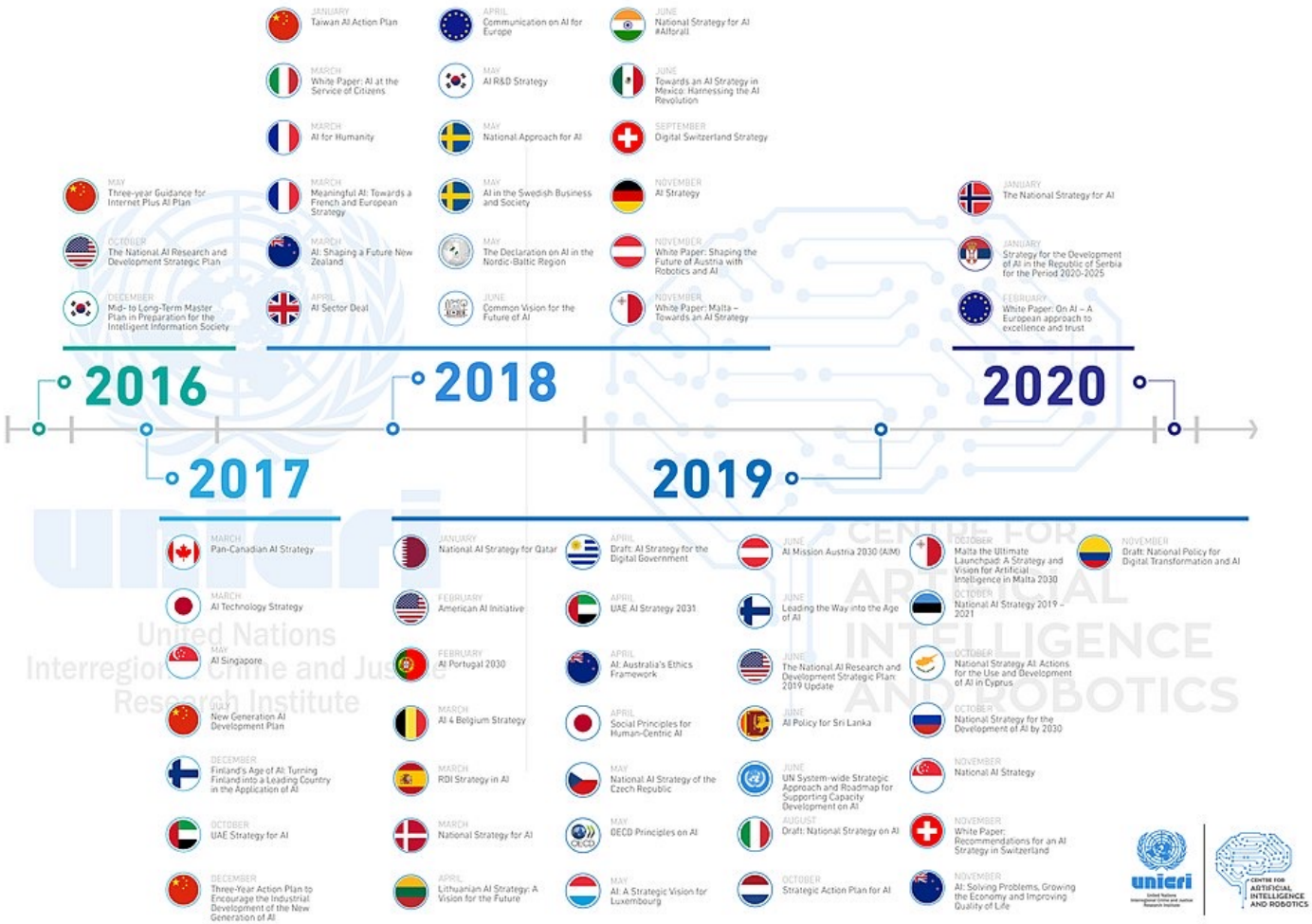
https://cloud.google.com/learn/what-is-artificial-intelligence

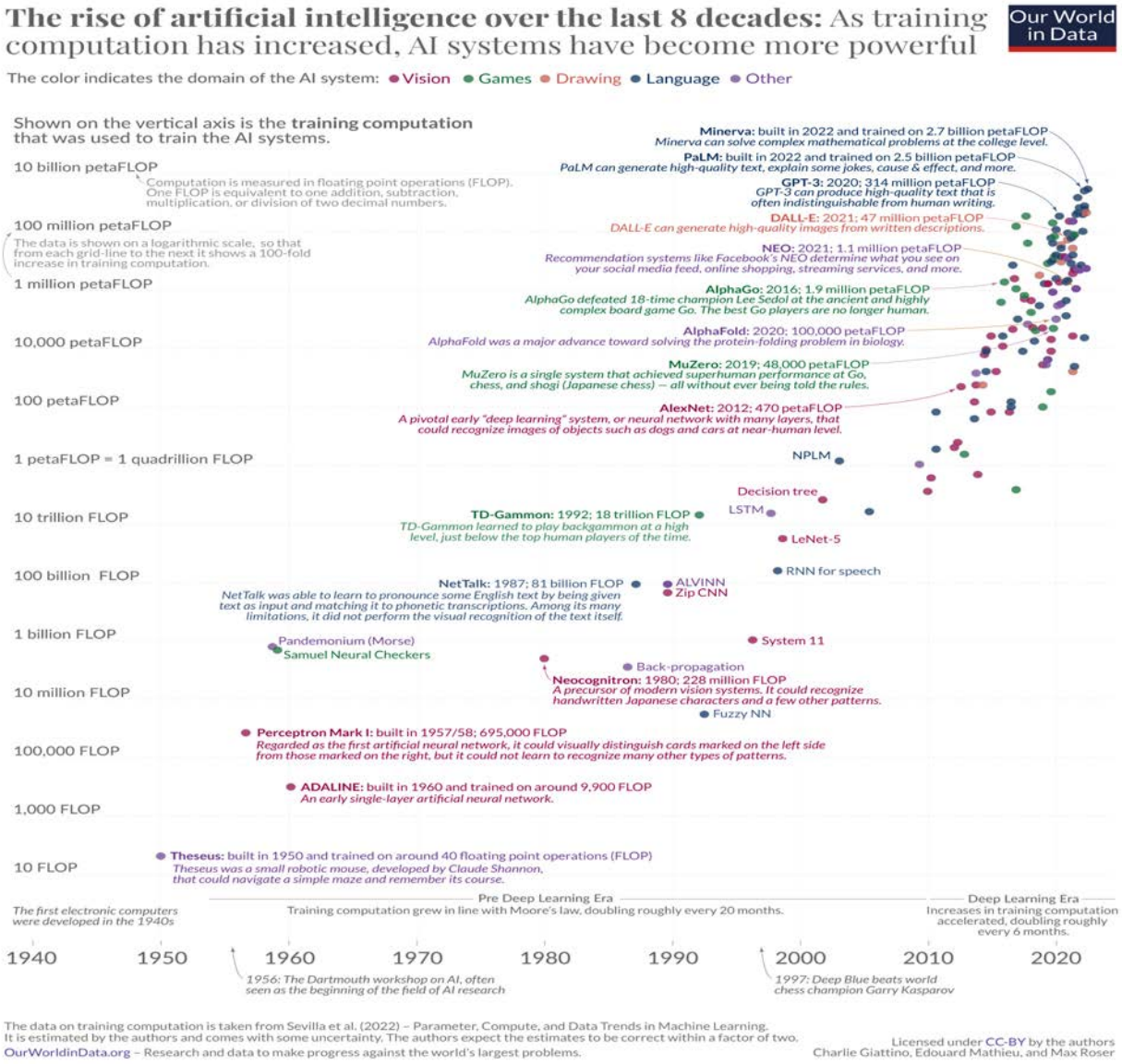


# Strategic Documents Timeline

UN Interregional Crime and Justice Research Institute

Nations and international organizations are seeing the need for AI public policies & regulations

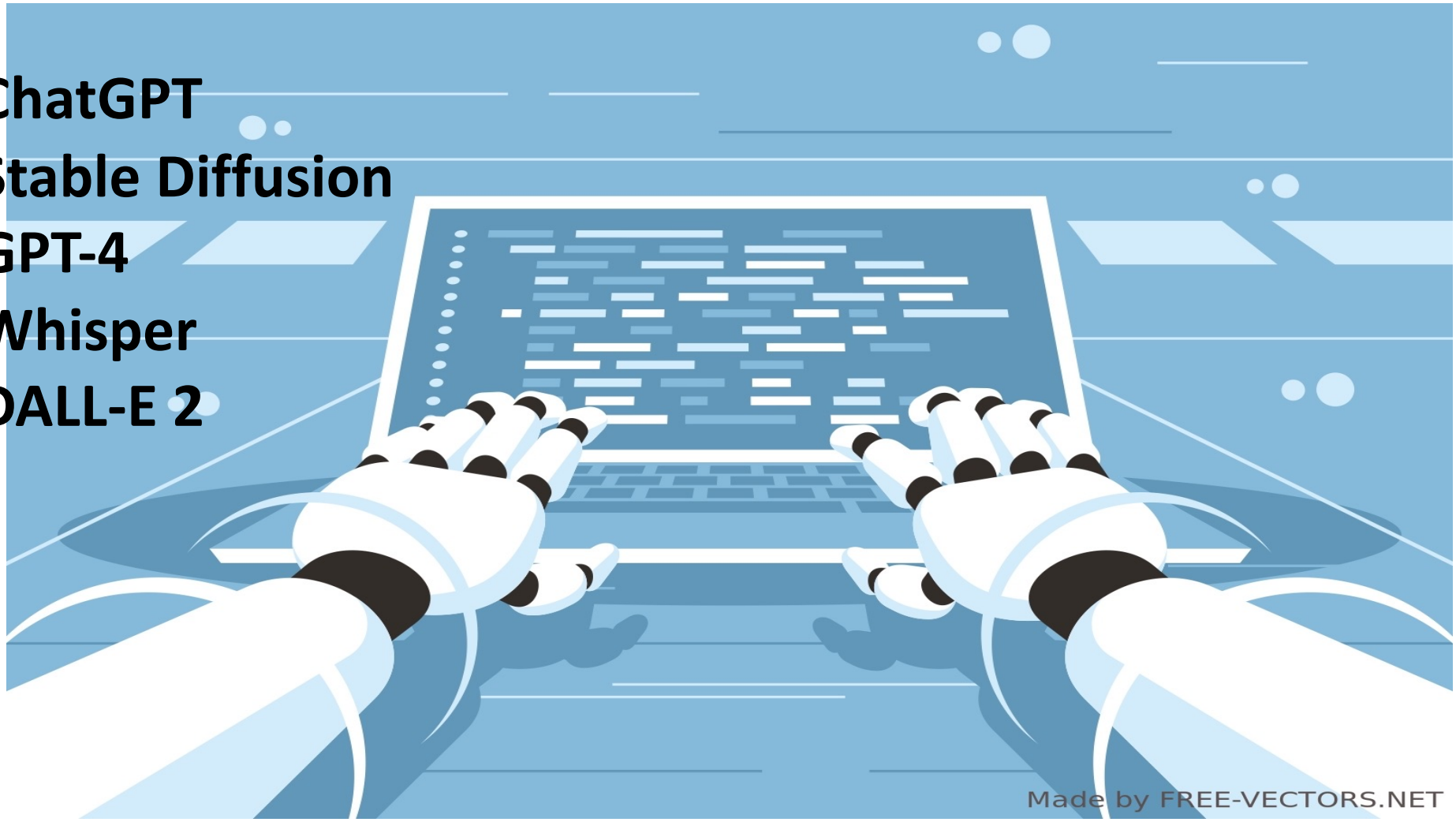





Systems are becoming more powerful with training.

Training systems requires access to data.

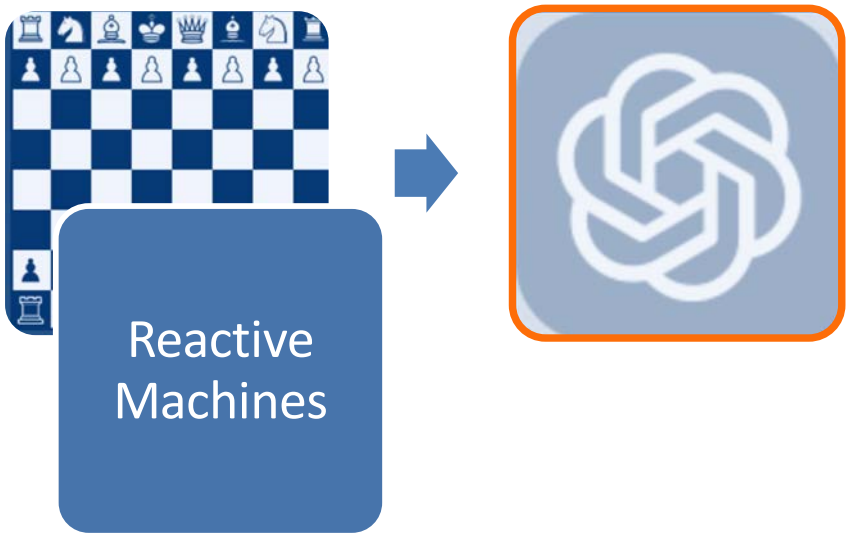
**ChatGPT**
**Stable Diffusion**
**GPT-4**
**Whisper**
**DALL-E 2**



Chapter Two

# The Promise of AI

# Stages of AI Development



Information used for Improved Outcomes

&

New Insights

**Ecosystems**

Health

Environment

Education

Industry

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https://cloud.google.com/learn/what-is-artificial-intelligence

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*Open Science is the principle and practice of making research products and processes available to all, while respecting diverse cultures, maintaining security and privacy, and fostering collaborations, reproducibility, and equity.*

-- U.S.OSTP

Image: NASA https://www.earthdata.nasa.gov/news/year-of-open-science

# International Open Science

Plan S
Making full & immediate Open Access a reality

UNESCO

International Science Council
The global voice for science

cOALITION S (2018)

EU initiative for all pubs from public funding to be open by 2021

Global consultation on open science (2019)

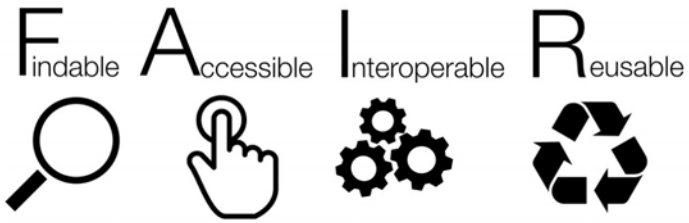
UN Sustainable Development Goals

Open science key in 2019-2021 action plan

Open report in 2020

# Data = Foundation of AI

Characteristics for Sharing Data

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# AI Ready Science Info Ecosystem

***Science as a global public good.*** Leveraging at the national level by science funders and policymakers

***Open science***. Promoting Data Sharing Principles

***Trust in science.*** Developing events to address trust in science and thwart mis/disinformation

***Capacity building.*** Aligning data from around the world and across disciplines. Recognize different cultures of practice and societal readiness levels

***Early career researchers.*** Supporting the next generation & asking for their ideas.

***Certified data repositories.*** Encouraging certified data repositories.

# AI Ready Repositories

Common data elements

Provenance management

Machine readable

Image: Microsoft 365 free library

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Affiliated body of the International Science Council.

Mission: to enhance the capabilities, impact, and sustainability of our member data repositories and data services

IPO hosted at UT and UT-ORII

ITO hosted by Ocean Network Canada, University of Victoria


# WDS Mission-Driven to:

## Create

Communities of trusted scientific data repositories.

## Strengthen

The scientific enterprise throughout the entire lifecycle of data by holding first-class data in trusted repositories that support first-class research output.

## Advocate

For repositories that make trusted data accessible to support transparent and reproducible science.

# Fulfilling the Promise

Strategic Objective 1.

Advanced Computing Ecosystem as a Strategic National Asset

Strategic Objective 2.

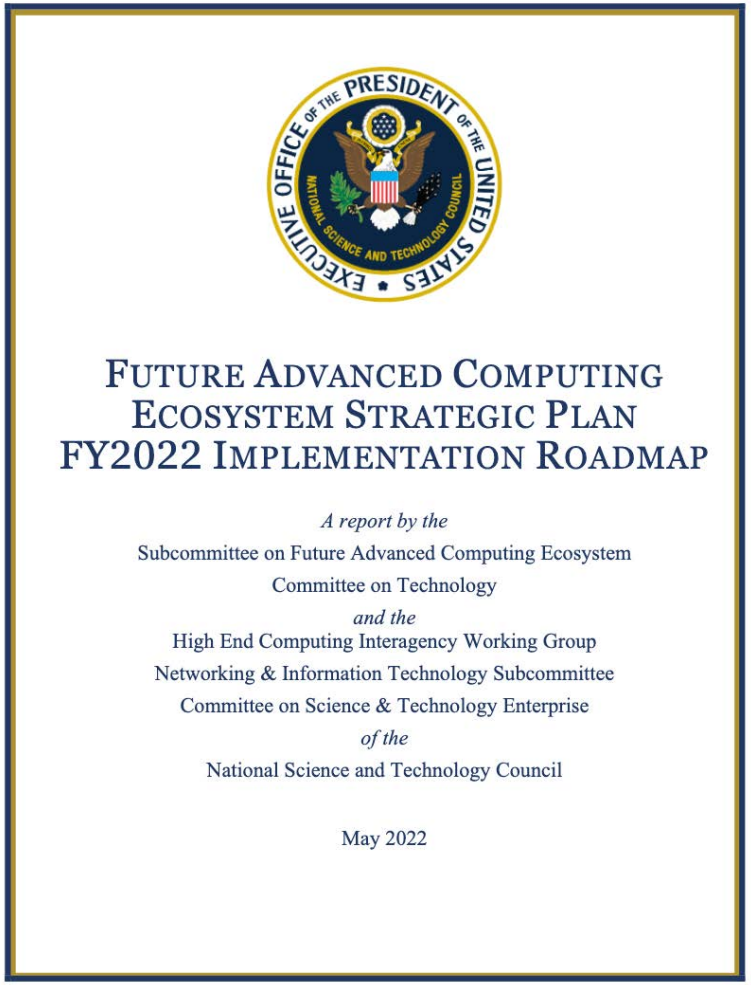
Robust, Sustainable Software and Data Ecosystem

Strategic Objective 3.

Foundational, Applied, and Translational R&D

Strategic Objective 4.

Fostering a Diverse, Capable, and Flexible Workforce



FUTURE ADVANCED COMPUTING ECOSYSTEM STRATEGIC PLAN FY2022 IMPLEMENTATION ROADMAP

*A report by the*

Subcommittee on Future Advanced Computing Ecosystem

Committee on Technology

*and the*

High End Computing Interagency Working Group

Networking & Information Technology Subcommittee

Committee on Science & Technology Enterprise

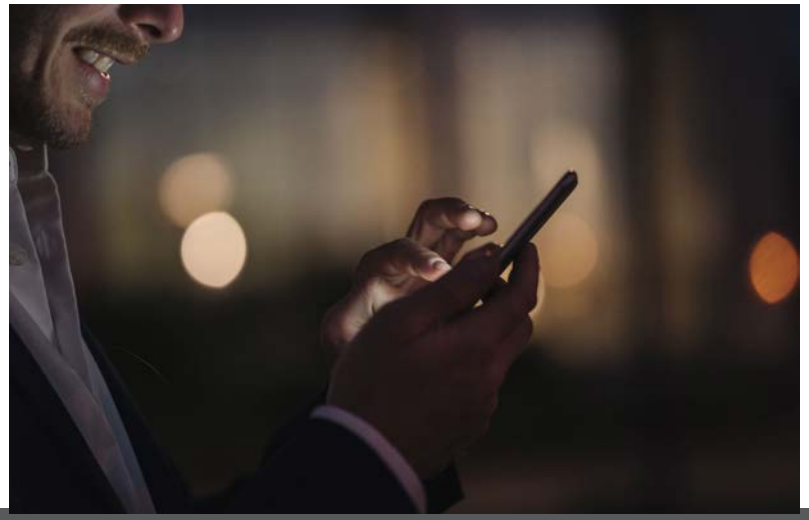
*of the*

National Science and Technology Council

May 2022

Chapter Three

# The Perils of AI



## Risks & Dangers

High Data & Compute Cost

Environmental Harm from Compute

Misuse/ Disinformation

Lack of Social Equity

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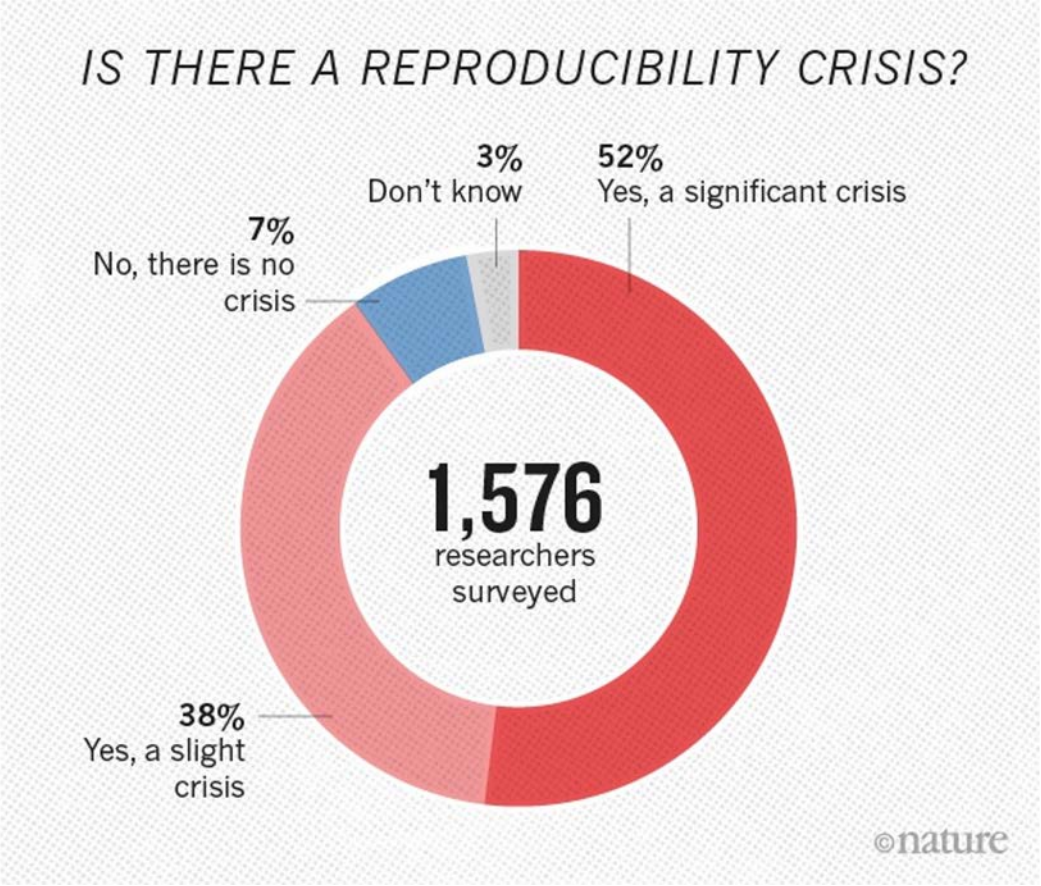
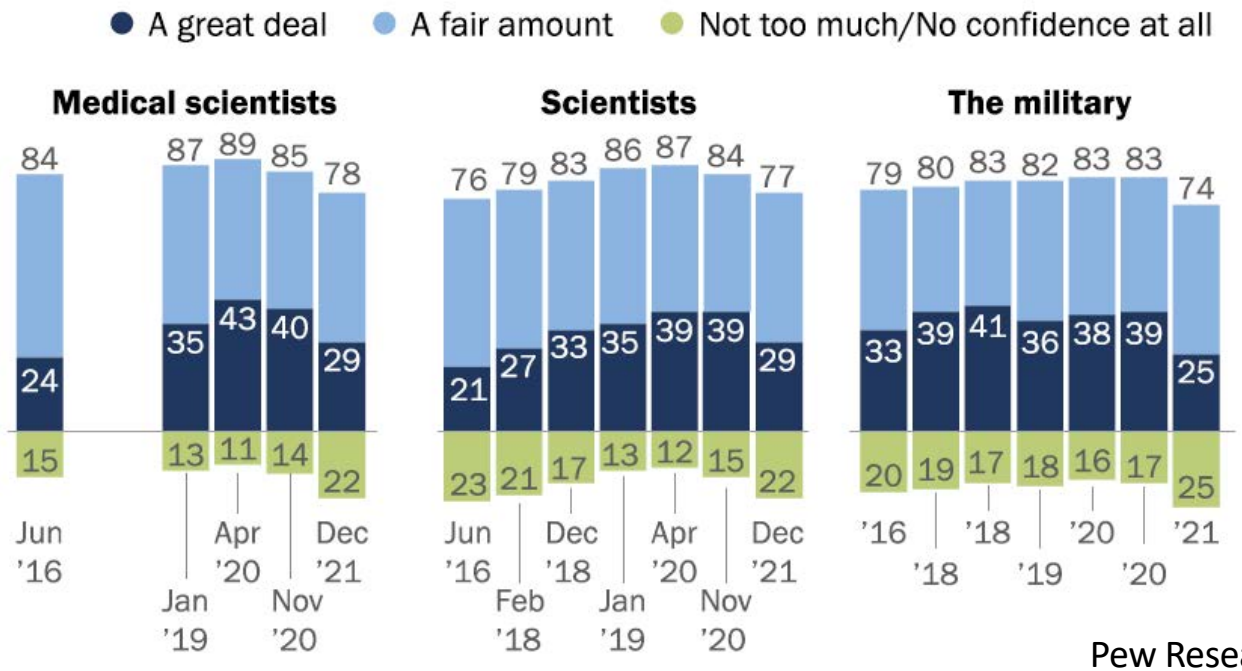
# Scientific Credibility



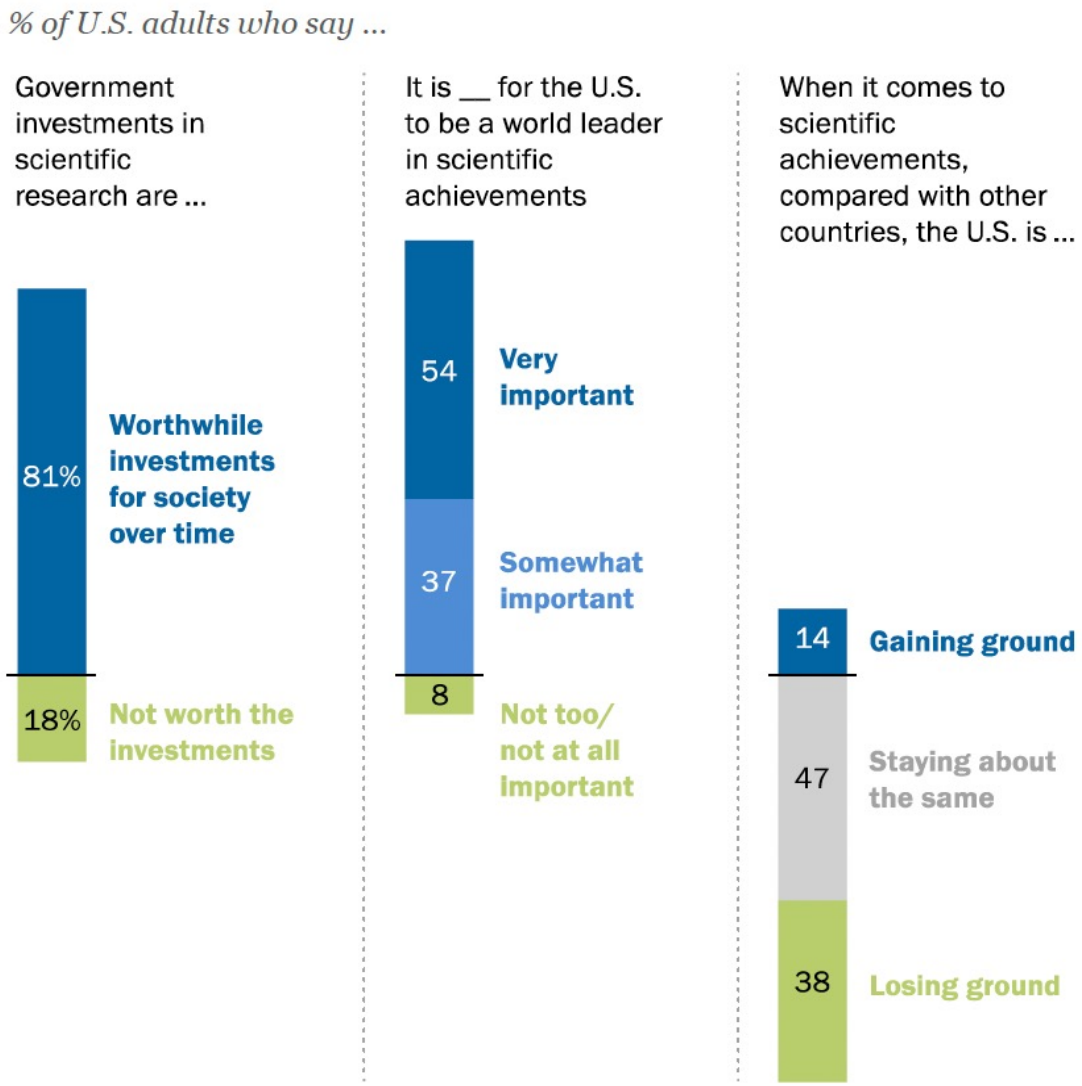

https://www.nature.com/articles/533452a

## Public confidence in scientists and medical scientists has declined over the last year

*% of U.S. adults who have ____ of confidence in the following groups to act in the best interests of the public*




Pew Research Center conducted 30 Nov-12 Dec 2021




The public values investing in science.

AI is the next-gen for science.

Note: Respondents who did not give an answer are not shown.
Source: Survey conducted Sept. 13-18, 2022.
"Americans Value U.S. Role as Scientific Leader, but 38% Say Country Is Losing Ground Globally"

PEW RESEARCH CENTER

# Strong Repositories support Credibility

- Rich Data Documentation
- Long-term Data Storage
- Responsible Data Sharing
- Focus on FAIR
- Information Literacy

Chapter Four

# Info Pros & Trusted AI

# AI ready Info Ecosystem…

Values all data and believes it is an important asset no matter how it is held.

Believes missing data can reduce the effectiveness and potentially creates bias and inequity of AI outcomes.

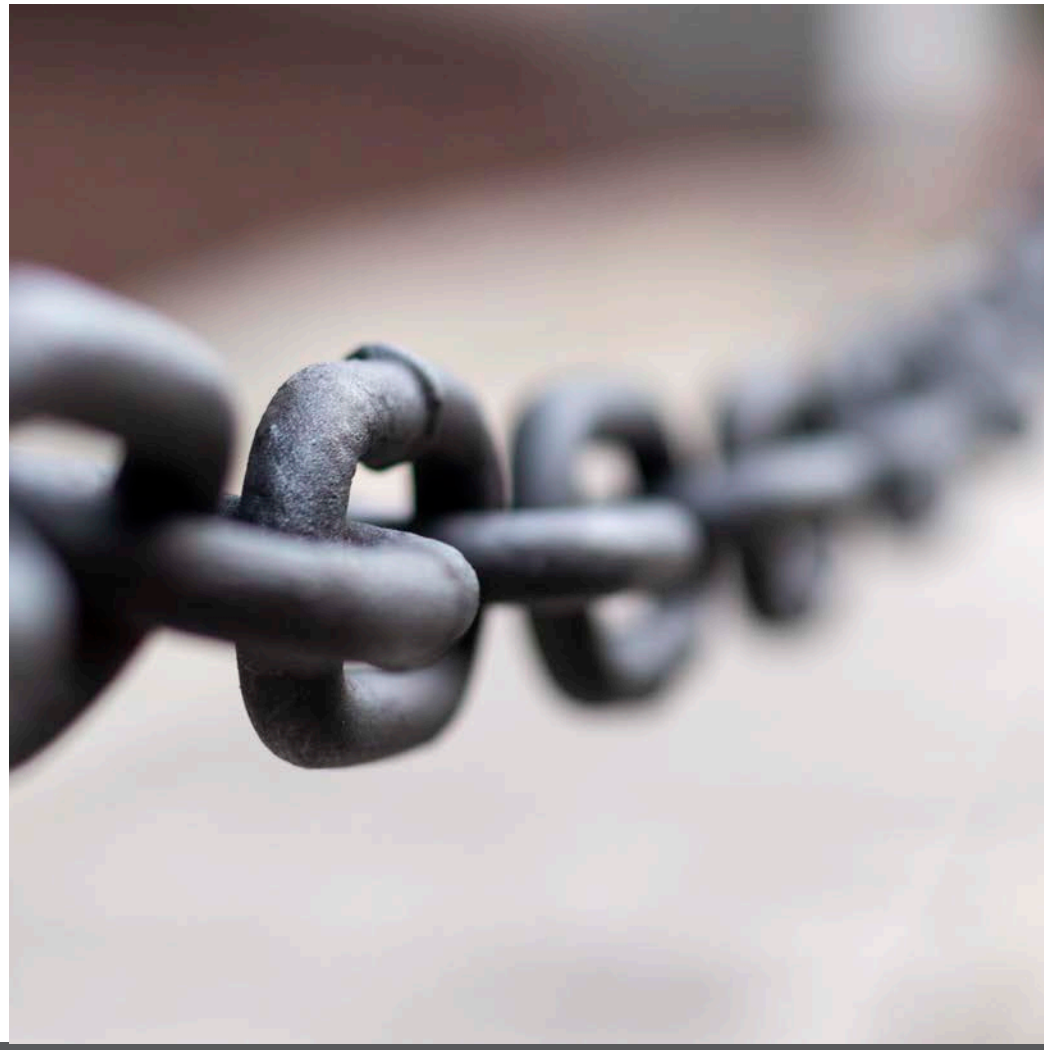
Identifies the need for developing and sustaining mature data repositories that can transition data into holdings that make it accessible for AI processes.

Acknowledges that managing data is important for interoperability – a key for high-quality AI activities.

# Fostering strong AI

***avoiding Garbage In/Garbage Out**

- Data is robust (valid & scientifically sound)
- Data is persistent
- Data is secure (can't be corrupted / hacked)
- Connections are secure for data pulls and data contributions
- Workflows are created to foster reproducibility



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# TRUSTed Repositories

How we hold data assets matters:

TRUST – international movement to improve data repositories

- **T**ransparency
- **R**esponsibility
- **U**ser focus
- **S**ustainability
- **T**echnology

Image: Microsoft 365 free library

# Keys to Move towards Trusted AI

- Treat data as a valuable asset beyond the life of a specific project.
- As with any asset – data should be intentionally managed
- Include data specialists as partners throughout the AI design process
- Support international organizations for data management and sustainability

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