

# BIG DATA, AI AND DIGITAL PUBLIC SERVICES

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# RESEARCH @ VESTFORSK



## BIG DATA

### Revealing Patterns Through Data

Utilizing data to enhance the way organizations work in different sectors and industries.



## ARTIFICIAL INTELLIGENCE

### Simulation of Human Problem-Solving

Using machine learning and other AI technologies to solve business and social challenges.



## DATA SCIENCE

### Making Data Centric Decisions

Transforming organizations by shifting focus from a transactional use of data to treatment of data as an asset.

To enable data-intensive research and innovation for regional business needs and broader societal issues.

## RESEARCH THRUSTS

Fundamental and applicable research covering aspects of data, information and knowledge engineering, and design of software tools with a human focus which should consider the personal, social, and cultural contexts in which such tools are deployed.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



11 SUSTAINABLE CITIES AND COMMUNITIES



16 PEACE, JUSTICE AND STRONG INSTITUTIONS



17 PARTNERSHIPS FOR THE GOALS



# FOUNDATIONAL PRINCIPLES

## **Rule of Law:**

Public administration must operate within the framework of the law, ensuring fairness, accountability, and transparency in government operations

## **Public Interest:**

Decisions and actions in public administration should be made with the public interest in mind, prioritizing the welfare of the community and the common good

## **Accountability and Transparency:**

Public administrators are accountable to the public and their representatives, necessitating clear channels for reporting, oversight, and transparency in operations and decision-making

## **Efficiency and Effectiveness:**

Public administration aims to deliver public services efficiently, making the best use of resources to achieve the desired outcomes effectively

## **Equity:**

Services should be provided fairly, without discrimination, and with an aim to reduce inequalities within the community

## **Responsiveness:**

Public administration should be responsive to the needs of the public, adapting to changing circumstances and feedback from citizens

## **Ethical Standards:**

High ethical standards are critical, requiring public administrators to act with integrity and avoid conflicts of interest

## **Professionalism:**

Public administrators should possess the necessary skills and knowledge, and they should be committed to ongoing professional development

## **Political Neutrality:**

Civil servants and public administrators should carry out their duties without political bias, ensuring that the administration remains neutral and focused on policy implementation rather than politics

## **Strategic Vision:**

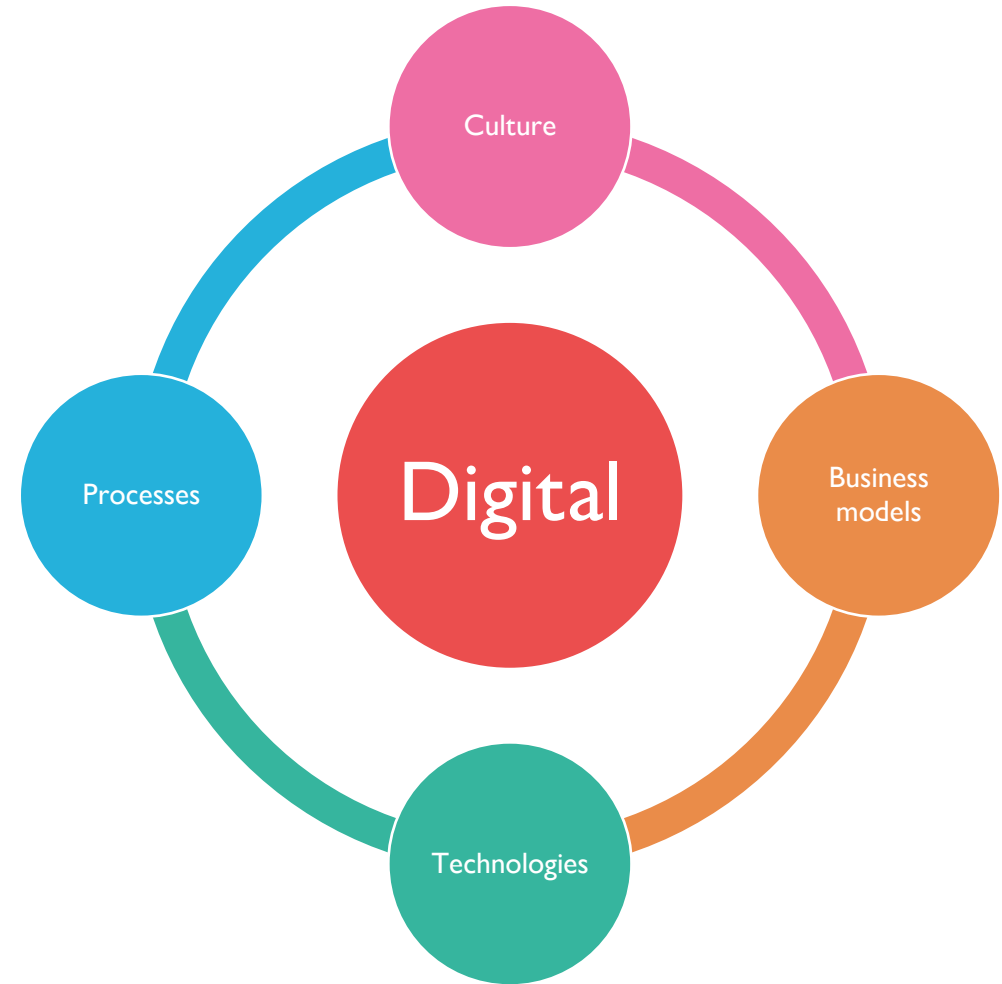
There should be a long-term strategic vision guiding public administration, ensuring that short-term actions align with long-term goals

The actual application of these cornerstones can vary by country and administrative context but serves as a guiding framework for the profession as a whole.

These principles are designed to guide the ways and management of public administration and ensure that public services are administered in ways that uphold democratic values and principles.

# DIGITAL TRANSFORMATION THE NEXT GREAT INDUSTRIAL REVOLUTION

- Digital is not the same as Information Technology (IT)
- Doing IT means using computers to store, retrieve, and exchange all forms of electronic data
- Applying the culture, processes, business and operational models and technologies of the cyberspace era to respond to people's high expectations



# DIGITAL TRANSFORMATION

## THE NEXT GREAT INDUSTRIAL REVOLUTION

- Digital transformation means *changing* how an organization runs itself
- Use of digital technologies to *modify* or *create* new organizational processes, culture, business models and experiences
- Help companies be more *profitable* at lower costs, while it can help public institutions *improve services* at lower costs
- *Efficiency* is a key benefit, but digitalization can also boost *innovation* and *creativity*





# DIGITAL TRANSFORMATION IN THE PUBLIC SECTOR



## What Does Digital Transformation Mean?

As we traverse the age of AI, asking the right questions becomes essential for the public sector. It triggers a mindset shift, enabling us to explore the role and responsibility of the public sector in harnessing the power of AI and big data.



## What Does human-centric mean?

By asking the right questions, we can envisage the type of services the public sector could and should be providing. This unlocks a dialogue, presenting an opportunity and challenge to create a new generation of human-centric services.



## Power and responsibility

To whom much is given, much will be required.

It means we are held responsible for what we have.

# DIGITAL TRANSFORMATION IN THE PUBLIC SECTOR

- Using technology for the purpose of enhancing people's lives
- Taking off layers of complexity from public services
- Deliver better and more accessible services
- Serving everyone
- Not just the effort of digital teams, but requires everyone to be involved
- Help governments inform and evaluate decision making

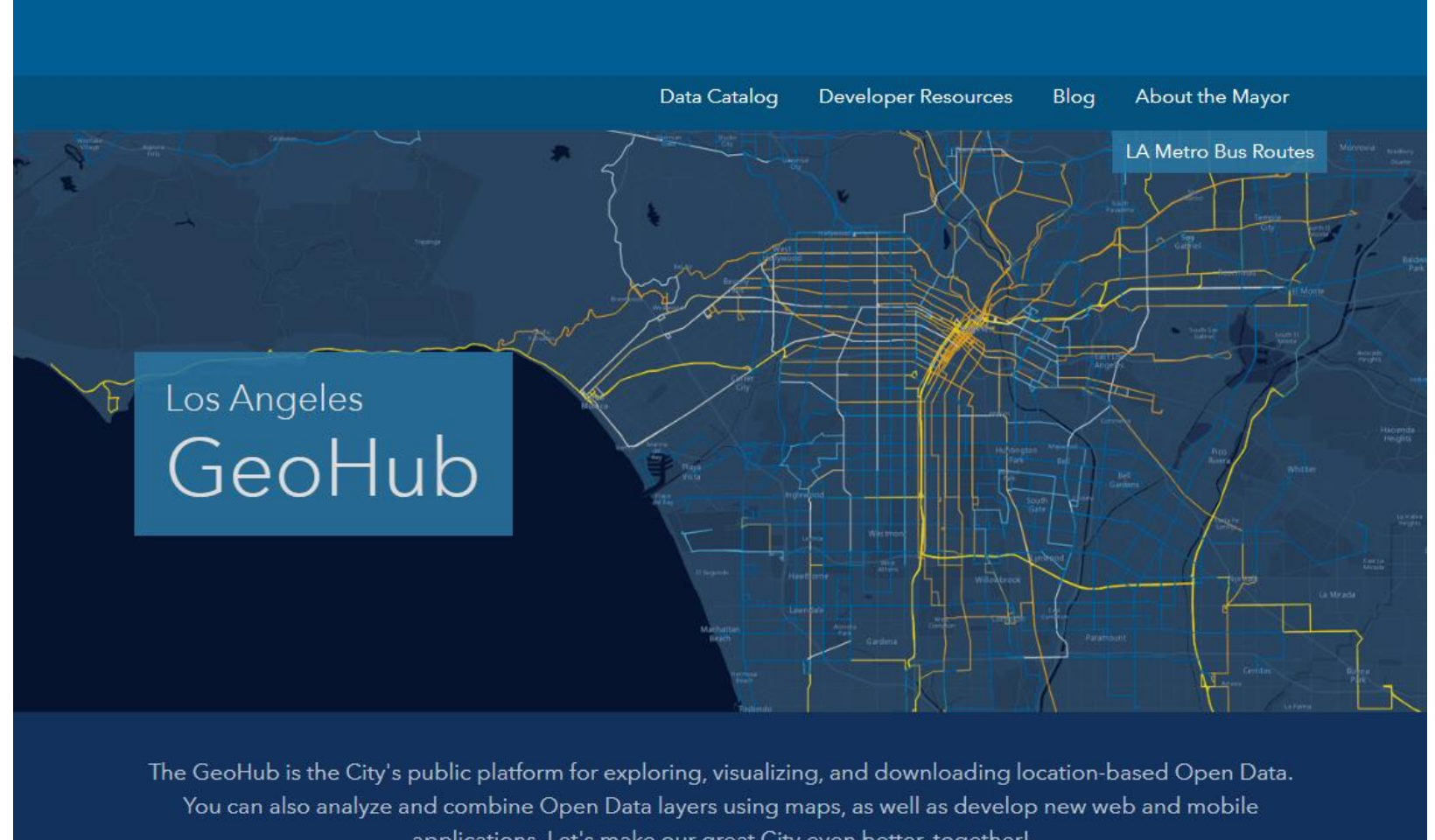


Increasing *Transparency* in resource allocation through Geolocation Data

- in showing how public funds are distributed
- for instance, in infrastructure development or social services

### City of Los Angeles

**GeoHub** – the city leverages geolocation data to provide public access to various datasets, including infrastructure and resource allocation



<https://geohub.lacity.org/>

# EXAMPLE: GEOLOCATION DATA



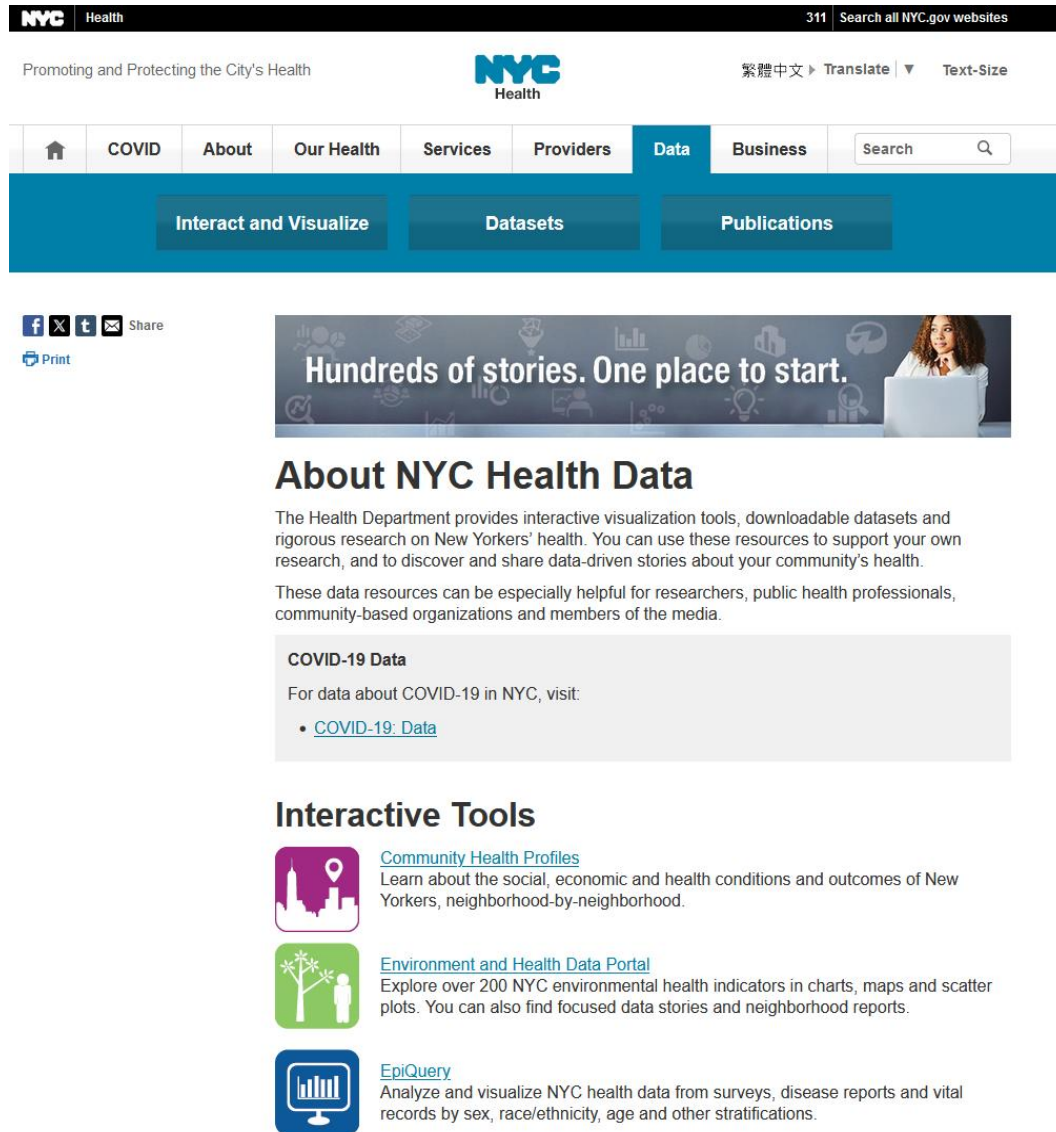
# EXAMPLE: FOSTERING COMMUNITY ENGAGEMENT AND ACCOUNTABILITY

- To the public fosters a dialogue between government and citizens, enhancing transparency and accountability
- Smart Dublin initiative
  - The city uses various data sets, including geolocation data, to engage with citizens and improve city services
  - Use the latest technologies to interrogate open data and unveil effective solutions for most pressing issues



<https://smartdublin.ie/>

New York City's Data-Driven Health, where data analytics is used to improve public health services and planning



The screenshot shows the NYC Health Data website. At the top, there's a navigation bar with 'NYC Health' and a search bar. Below it, a secondary navigation bar includes links for 'Home', 'COVID', 'About', 'Our Health', 'Services', 'Providers', 'Data' (which is highlighted), and 'Business'. A search bar is also present. Below the navigation bar, there are three main sections: 'Interact and Visualize', 'Datasets', and 'Publications'. The main content area features a banner with the text 'Hundreds of stories. One place to start.' and a woman working on a laptop. Below the banner, the section 'About NYC Health Data' explains that the Health Department provides interactive visualization tools, downloadable datasets, and rigorous research on New Yorkers' health. It also mentions that these resources are helpful for researchers, public health professionals, community-based organizations, and members of the media. A 'COVID-19 Data' section provides a link to 'COVID-19: Data'. The 'Interactive Tools' section lists three tools: 'Community Health Profiles' (learn about social, economic, and health conditions), 'Environment and Health Data Portal' (explore over 200 NYC environmental health indicators), and 'EpiQuery' (analyze and visualize NYC health data from surveys, disease reports, and vital records).

NYC Health

Promoting and Protecting the City's Health

311 Search all NYC.gov websites

繁體中文 Translate Text-Size

Home COVID About Our Health Services Providers Data Business Search

Interact and Visualize Datasets Publications

f x t e Share Print

**Hundreds of stories. One place to start.**

**About NYC Health Data**

The Health Department provides interactive visualization tools, downloadable datasets and rigorous research on New Yorkers' health. You can use these resources to support your own research, and to discover and share data-driven stories about your community's health.

These data resources can be especially helpful for researchers, public health professionals, community-based organizations and members of the media.

**COVID-19 Data**

For data about COVID-19 in NYC, visit:

- [COVID-19: Data](#)

**Interactive Tools**

**Community Health Profiles**  
Learn about the social, economic and health conditions and outcomes of New Yorkers, neighborhood-by-neighborhood.

**Environment and Health Data Portal**  
Explore over 200 NYC environmental health indicators in charts, maps and scatter plots. You can also find focused data stories and neighborhood reports.

**EpiQuery**  
Analyze and visualize NYC health data from surveys, disease reports and vital records by sex, race/ethnicity, age and other stratifications.

# EXAMPLE: DATA-DRIVEN DECISION-MAKING IN PUBLIC ADMINISTRATION

- To analyze geographic patterns and trends, identifying areas of need to allocate resources effectively
- Sectors:
  - Public health,
  - urban planning, and
  - emergency service

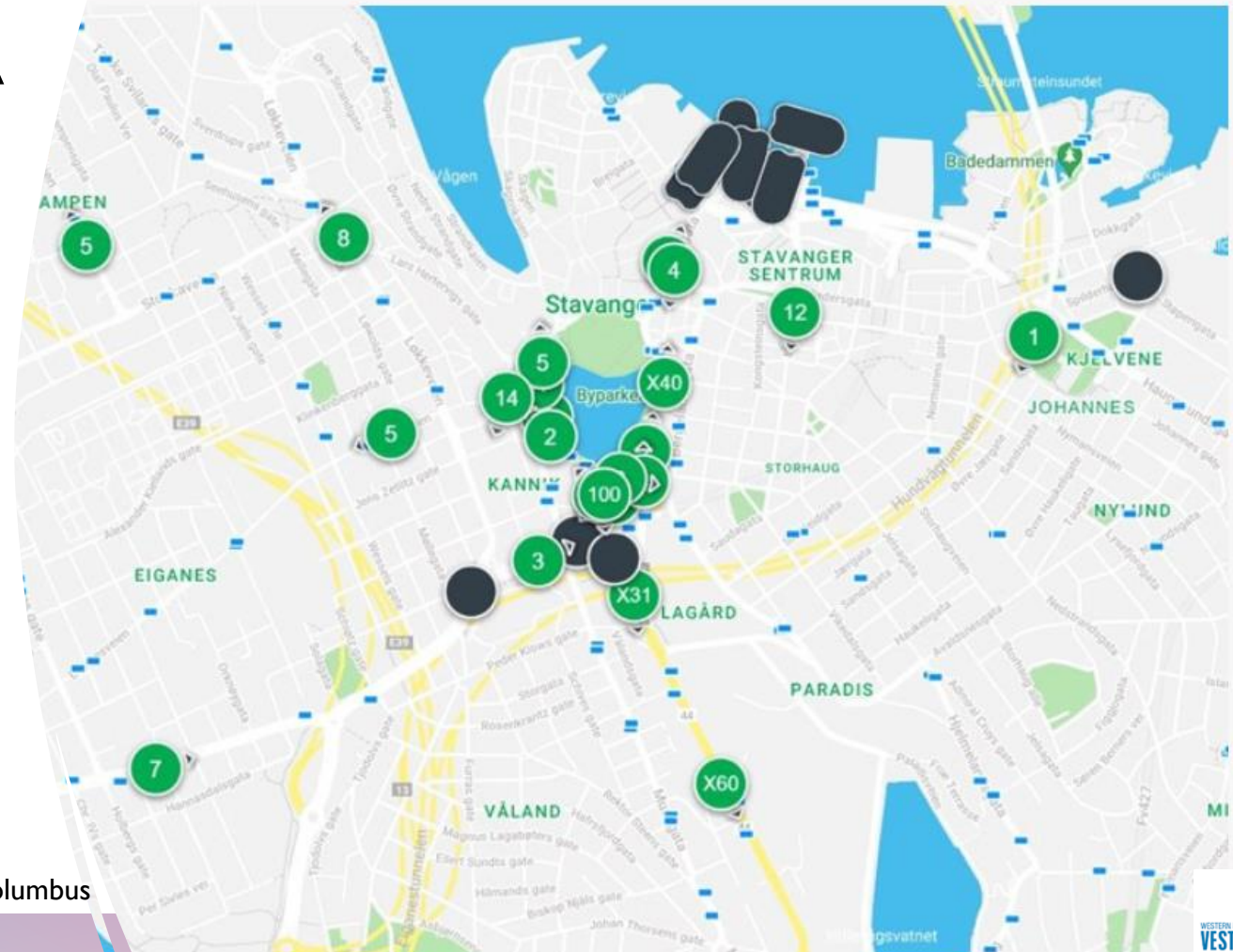
<https://www.nyc.gov/site/doh/data/data-home.page>

# EXAMPLE: IMPROVING SERVICE DELIVERY THROUGH GEOLOCATION DATA

- Understanding the geographic distribution of service needs allows for optimizing efforts and ensuring equitable service provision
  - The Kolumbus Predictive Mapping Solution in Stavanger
    - Real-time geolocation data to enhance public transportation

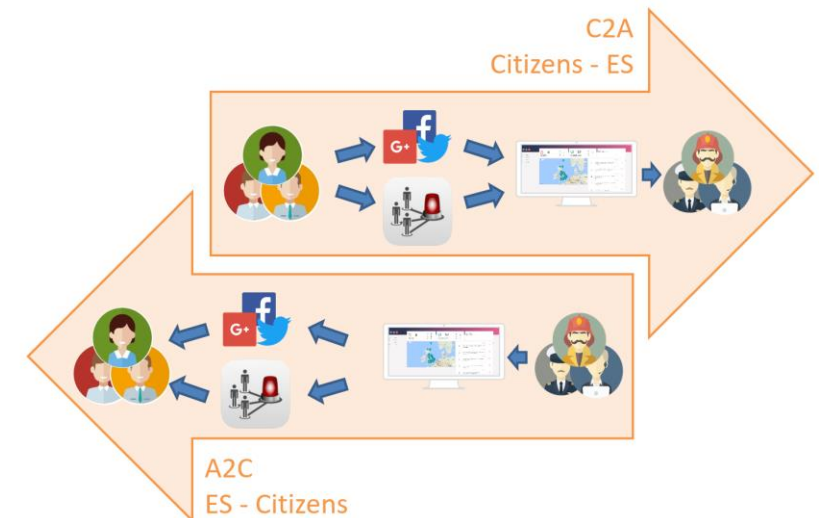
<https://cloud.google.com/customers/kolumbus>

the map



# RESPONSIVENESS

- Public administration should be responsive to the needs of the public, adapting to changing circumstances and feedback from citizens
  - Allowing citizens to report issues or request services through mobile apps using geolocation.
  - Enhanced Emergency Response: Using geolocation technology for quick identification of emergency locations, leading to faster response





# BIG DATA

A shared understanding of current big data landscape

- With digitalization, it's both easier and economical to collect, store and analyze large amounts of data
- Purpose:
  - Help governments identify populations in need and target their support in the event of adverse shocks
  - Support decision making and evaluate the impact of government policies and measures

Vast <b>amount</b> of data processed	Processing of less controllable and <b>accurate</b> data	Ability of turning data into <b>value</b>	Processing of data in variable <b>formats</b>
<b>Speed</b> of data processing (velocity)	<b>Heterogeneous types</b> of processed data	Use of <b>algorithms</b>	Processing of data in <b>unstructured</b> forms
Use of <b>new types</b> of data	Possible <b>predictive</b> analyses	<b>Opacity</b> of processing	Remote <b>storage</b> of data
<b>Real-time</b> data processing and analysis	Multiplicity of data <b>sources</b>	<b>Repurposing</b> of data	Aggregation of data from multiple <b>sources</b>

Impact of some technical characteristics

Impact on:

- Privacy
- Sharing obligations
- International data transfer
- Free flow of data
- Contractual aspects
- Liability regime
- ...

# ETHICAL AND SOCIAL ISSUES

- Intelligent technologies first deployed in the sphere of marketing
  - Use was both lucrative and low-risk
- Intelligent technology moved beyond increasing the odds of making a sale to being used in higher-stakes decisions
  - healthcare, transport & mobility, finance and crime prevention
  - social and ethical implications arose



# ETHICAL AND SOCIAL ISSUES

- **Trust** issues arise where individuals do not have enough time to adapt to dynamic technological developments
- **Surveillance** issues concerns preventive policing
  - Rather than starting with a suspect and then monitoring him or her, the goal is to start from generalised surveillance and then generate suspects
- **Free will** could arise when individualism and moral responsibility are being challenged through the advancement of technology, for example in the case of self-driving cars
- The **rebound effect** is the difference between the expected and observed environmental impacts from new technologies aiming at efficiency improvements



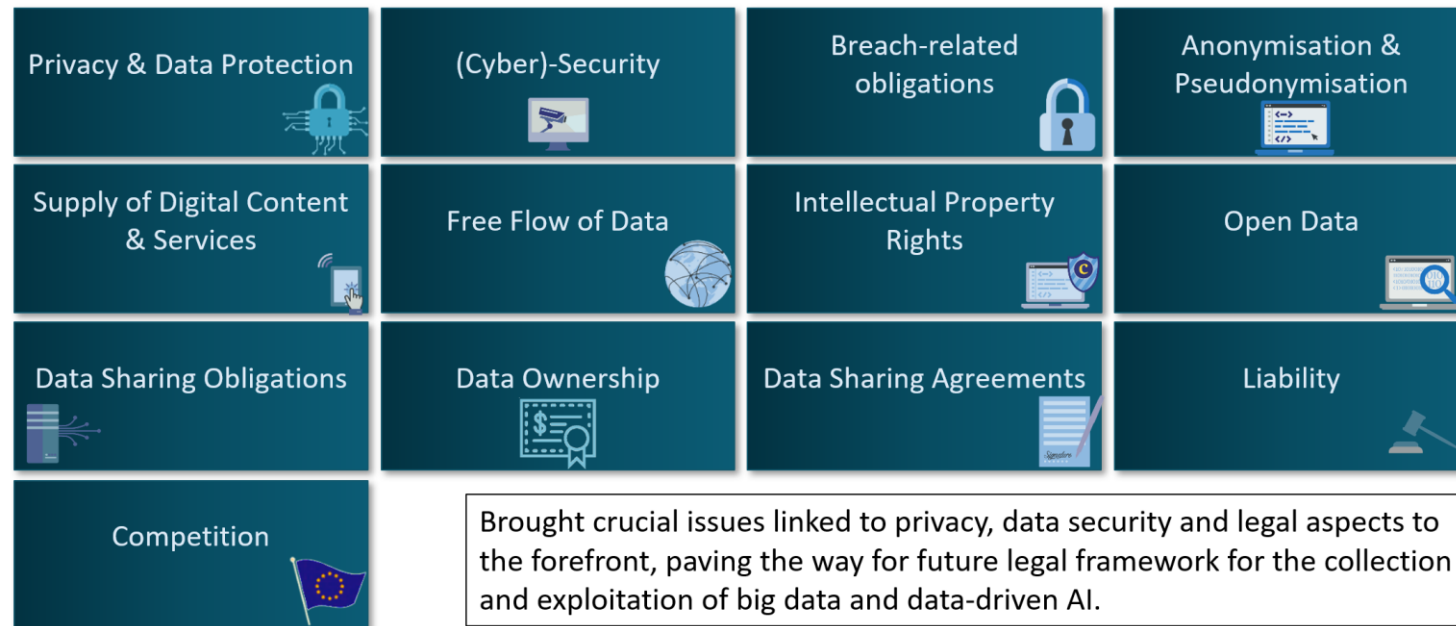
# LEGAL ISSUES

13 legal issues that are relevant to the production of, access to, linking of and re-use of Big Data

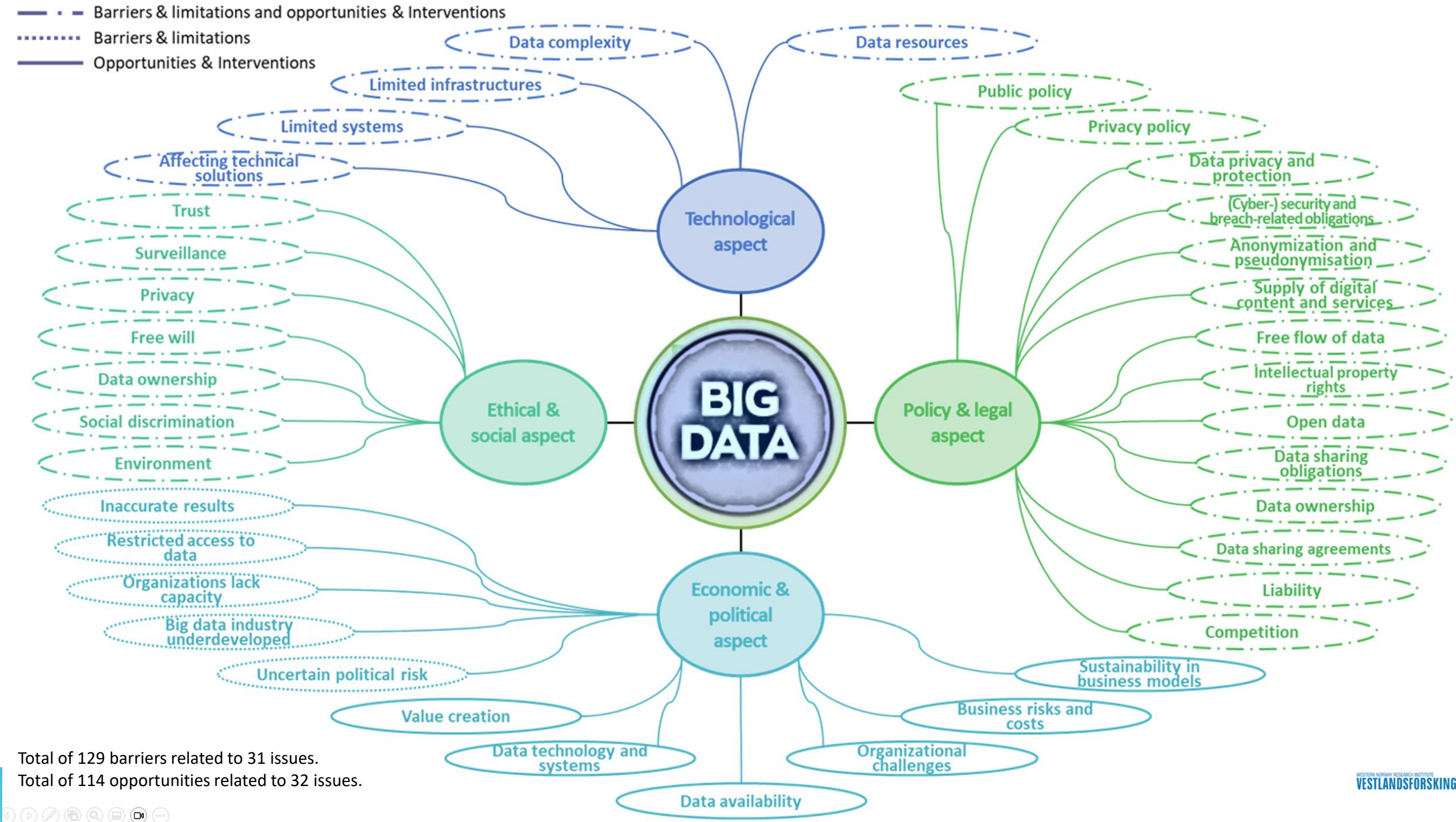
The “free flow of data” is typically mentioned in the debate on restrictions to cross-border data flows

As the increasingly devastating impact that cyber-threats and attacks may have on society, issues related to cyber-security have become more and more important in recent years

All actors in the data economy are required to observe the legal obligations related to security and cybersecurity, imposed in various legislations at EU and national level







# RESEARCH AND POLICY ROADMAP



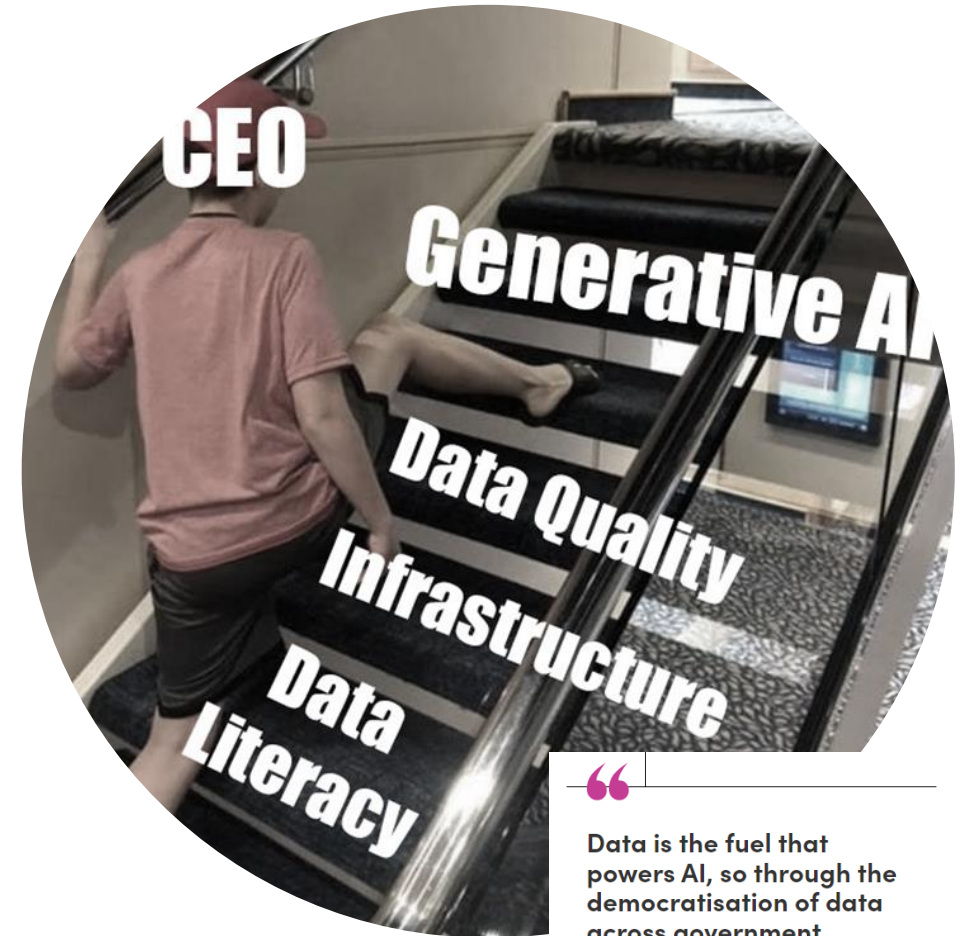


Low-Quality Data = Low-Quality AI  
Low-Value Data = Low-Value AI

# NO DATA = NO AI

- Access to data is the largest factor in quantifying a business's AI monetization opportunities
- Data and AI product strategy turns data into revenue and cost savings
- No Data and No AI Strategy = No AI
- The business is not ready for AI or analytics until
  - everyone knows why the business uses those technologies

Awareness and alignment are often overlooked purposes of Data, Analytics, and AI Strategies



Data is the fuel that powers AI, so through the democratisation of data across government, leaders would be able to maximise the potential to extract value from AI investments.

# AI READINESS

- Need to prepare data for AI
  - Investing in the right platforms in 2024 will help the public sector prepare to fully leverage gen AI and LLMs
  - But, before the data needs to be “AI-ready”
- 80 % time is spent taking data that is unstructured (for example, text documents, images, video and chat logs) or semi-structured (for example, emails, XML docs and web pages) and putting it into a form that can be digested and analyzed by AI
  - For full advantage of generative AI tools requires clean, usable data
- The key is how the public sector transforms its approach to knowledge management, and the role data plays in that transformation

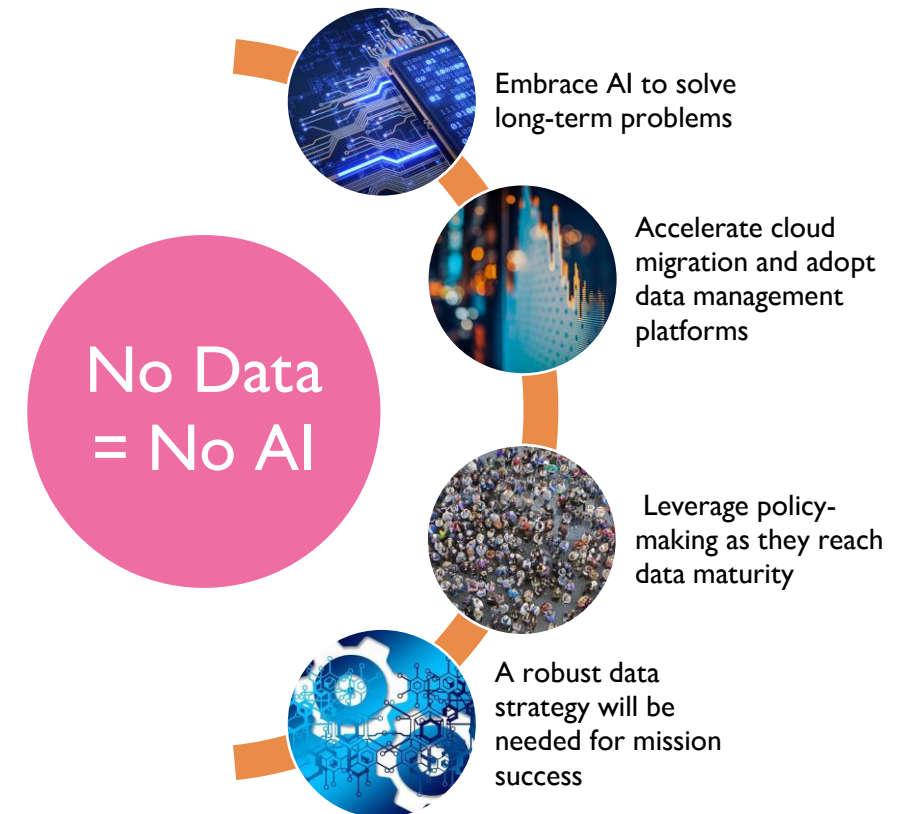




# DATA IS A PREDICATE FOR AI

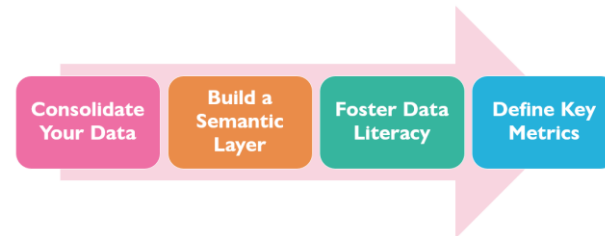
To take advantage of the benefits of AI need to be in control of their data

- A strong data foundation can help public sector leaders modernize their data infrastructure and collaborate with partners, policymakers and stakeholders in a secure and scalable way
- Build trust in first-party data (internal data)
  - to start with a corpus of data whose provenance is not in question, then
  - use AI to organize and package that data to make it useful for you and the ecosystem at large



# AI-READY DATA

- Governments are generating and collecting data from sensors, systems, and contractors at a rapid pace, but collecting raw data is only the first step
- The next step is to clean and process this data into a usable format that can power an AI application
  - On a basic level, preparing data means cleaning and parsing the information into a structured format
  - On a more complex level (as an *on-ramp* for AI-researchers to work with unfamiliar data)



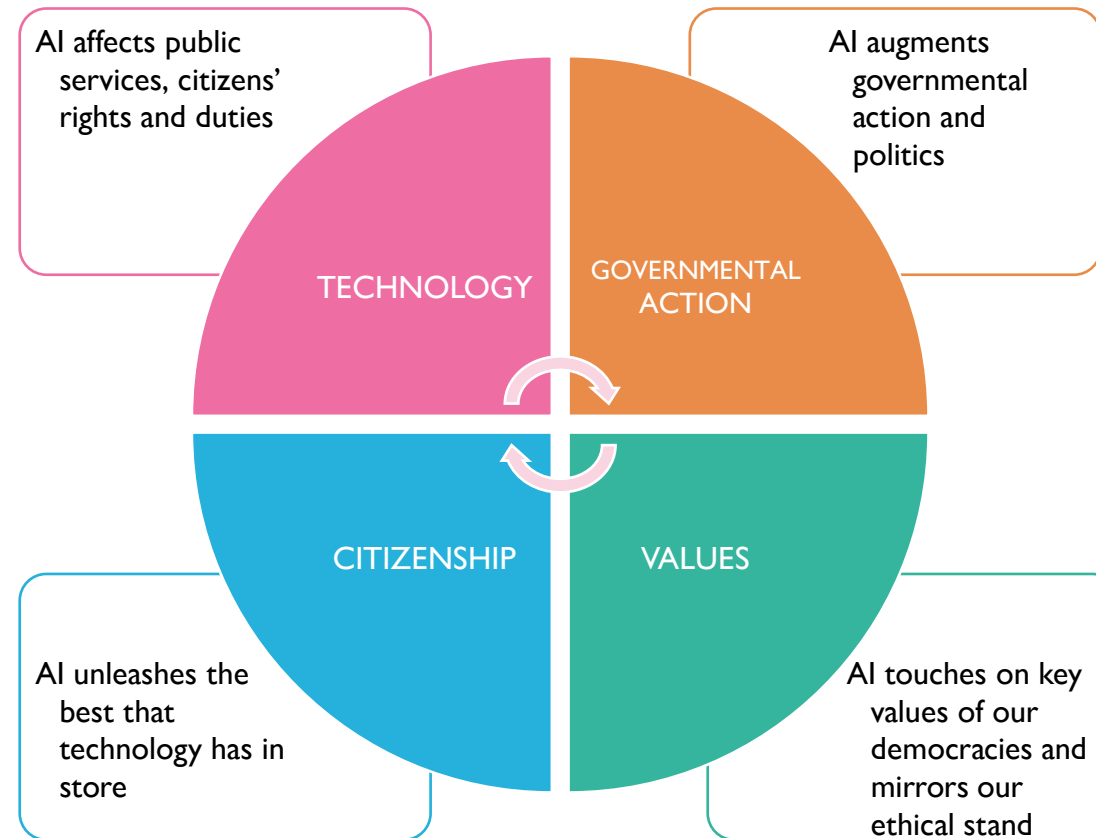
- AI-ready data is less time-consuming to analyze
- Strategic and ethical reasons motivate the move toward AI-ready data



# DATA-DRIVEN AI AT THE CROSSROAD OF SEVERAL DIMENSIONS

## The right time for decisive action toward augmented public services

In the move toward progress, public institutions and governments will be at the forefront of this technological journey while being protectors of its ethical and lawful use



At the crossroads between citizenship, political action and technology, AI offers great potential for the public sector

# AI SOLUTIONS REQUIREMENTS

- Functional and reliability.
  - Model literate users articulate their reliability requirements and evaluate model-based solutions
  - They leverage data and AI strategies to inform decision-making, so technology produces value by meeting their needs
- Data scientists need a problem space definition that connects business metrics with model metrics to assess how reliable the model must be to meet the business need



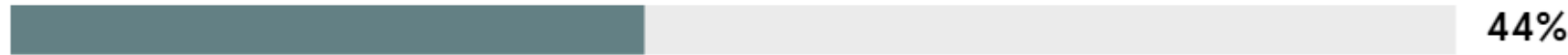
Every business needs someone who can  
build data and AI strategies



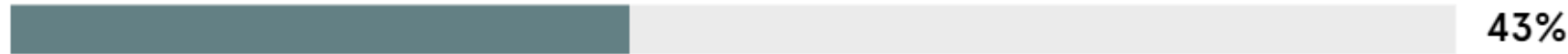
Cybersecurity vulnerabilities of AI



Ethical risks of AI



Making the wrong decisions based on AI recommendations



Legal responsibilities for decisions/actions made by AI systems



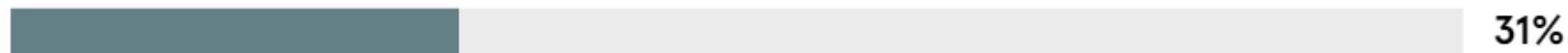
Failure of AI systems in mission critical/life-and-death context



Erosion of customer trust due to AI failures



Regulatory non-compliance risk



## KEY RISKS OF AI

- According to AI adopters from the public sector
- More than eight in 10 leaders see AI as “very” or “critically” important to their business success in the next two years

# BUILD PUBLIC TRUST IN AI AND DATA SHARING



Hold huge potential, but we must ensure advances don't come at a human and moral cost

- Have a range of voices around the decision table
  - Ensuring AI is explainable with a greater degree of transparency in training data, data gaps, and algorithmic logic can further reduce bias at scale
- Listen to citizen journalism – scrutiny is how you improve your product (service)
- Understand when not to use AI and data
  - AI is a tremendously powerful tool, but it's one of many, and certainly doesn't fit every situation

**Message!** Don't use technology just for the sake of it

# THANK YOU!

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