

BIG DIVE

**“POLICY-MAKING AND DATA ECONOMY AT THE
CITY LEVEL: UTOPIA OR REALITY?”**

AGENDA

“POLICY-MAKING AND DATA ECONOMY AT THE CITY LEVEL: UTOPIA OR REALITY?”

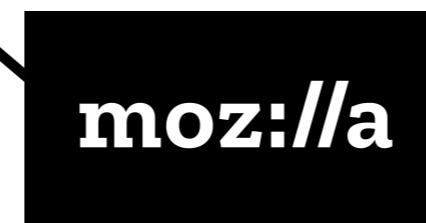
- / A few words about us, TOP-IX and BIG DIVE**
- / Are smart cities really smart?**
- / ...challenges, data, roles and policy-making...**
- / Data Ring: a canvas for data projects**
- / Guided interactive session on challenging cases**
- / Wrap-up**



**WHO WE ARE,
WHY WE ARE HERE**

**STEFANIA
DELPRETE**

BIG DIVE

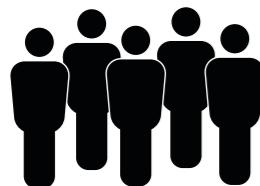


 **Effective Altruism**

-
- @astrastefania** 
 - astrastefania** 
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 - astrastefania** 

TOP-IX CONSORTIUM

NON PROFIT CONSORTIUM



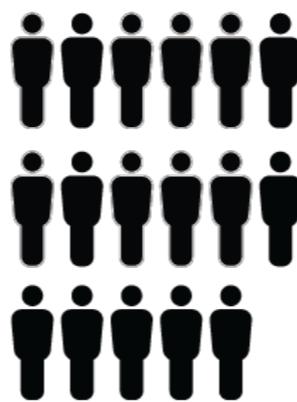
80+ Members
(15 in 2003)

**PUBLIC & PRIVATE
PARTICIPATION**

MISSION

IX NORTH-WEST
ITALY

DP
TO FOSTER
INNOVATION
BY LEVERAGING
INFRASTRUCTURE
ASSETS



18 employees

5 collaborators

2 directors

START-UP

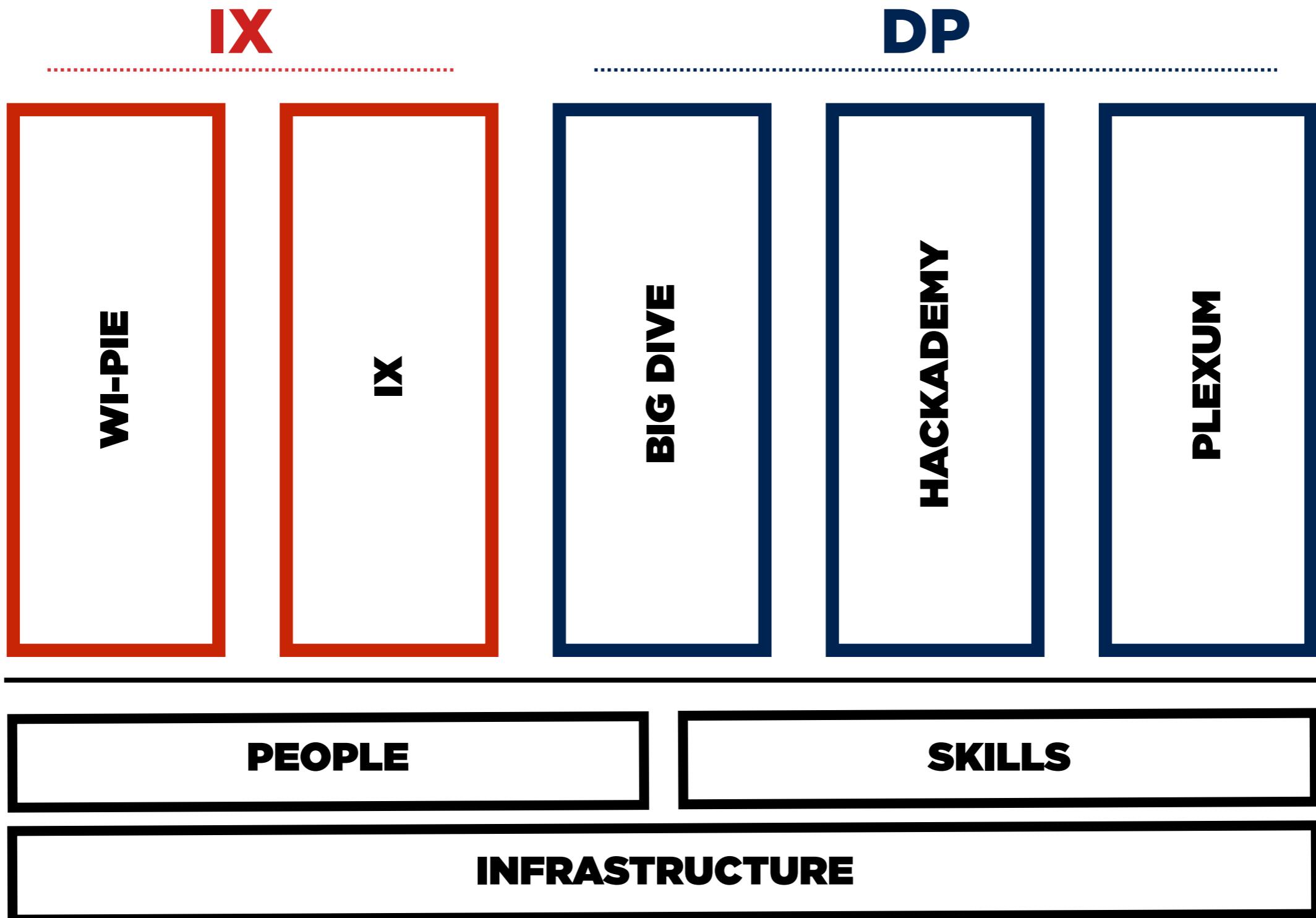
FUNDED
PROJECTS

EDUCATION

CORPORATE
INNOVATION

CIVIC TECH

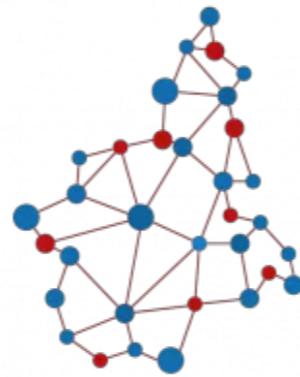
TOP-IX ACTIVITY MAP



OUR ACTIVITIES ABOUT DATA



Piattaforma Open Data
dati.piemonte.it



PIEMONTE VISUAL CONTEST

BIG DIVE | HACKING DEVELOPMENT, VISUALIZATION & SCIENCE



WHAT IS BIG DIVE ?

**BIG DIVE HAS BEEN
DESIGNED AS AN INTENSIVE
TRAINING PROGRAM AIMED
AT BOOSTING THE TECH
SKILLS IN ORDER TO
EXTRACT VALUE FROM
DATA AND TO GENERATE
IMPACT.**

BIG DIVE FOR COMPANIES

/ TRAINING COURSE



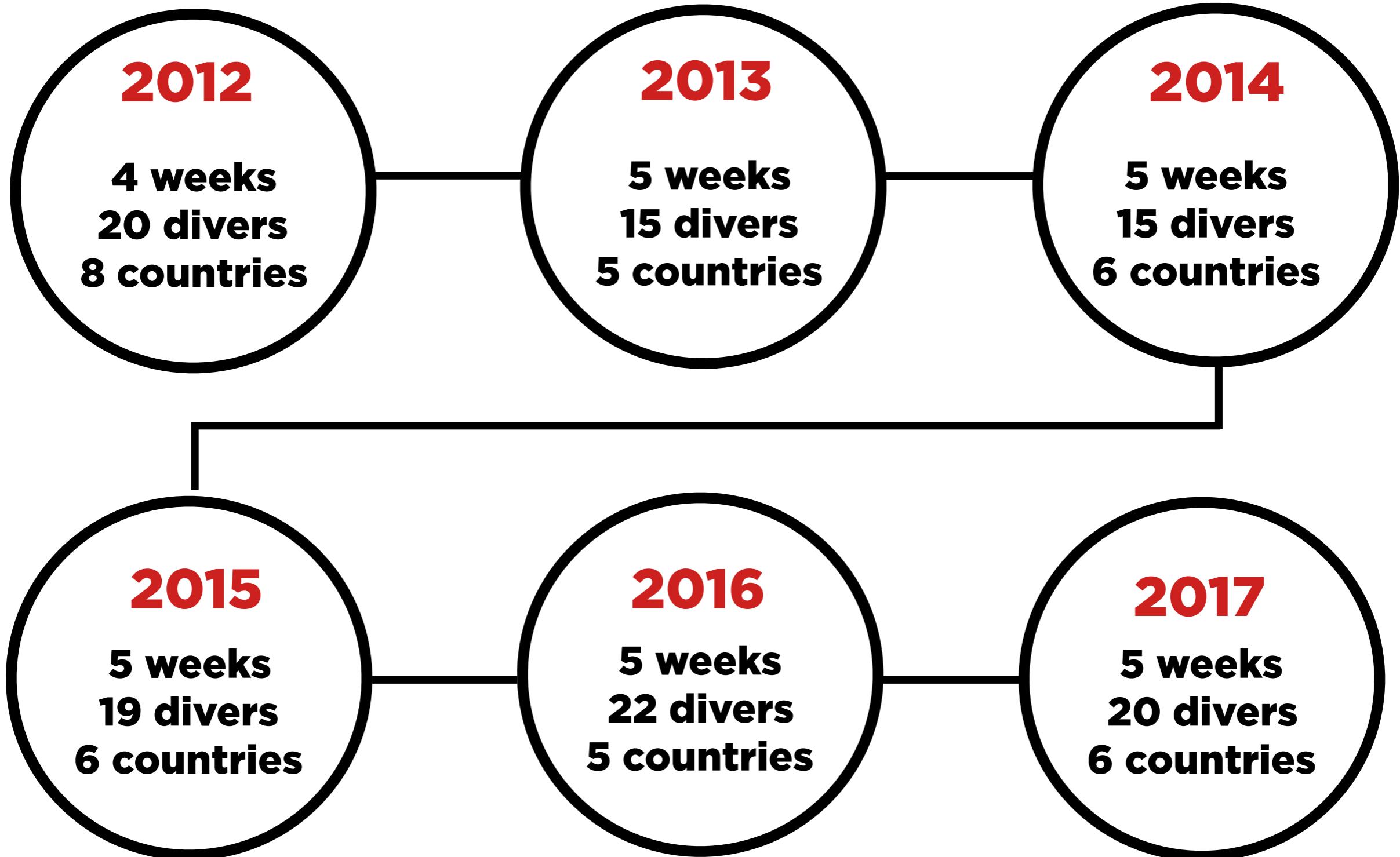
/ WORKSHOP



/ DATA DRIVEN PoC



THE BIG DIVE HISTORY



2018 BIG DIVE 7

BIGDIVE.EU/BIGDIVE7

students

9 data viz 1-week course

17 machine learning 4-week course

topics

Scaling data, complex systems, computer vision, speech recognition, GIS and geospatial...

theme

Mobility and networking in the city

data and collaborations

Turin administration: city traffic and penalties, INRIM laboratory, black boxes, car sharing

2019 BIG DIVE 8

BIGDIVE.EU

students

You?

theme and collaborations

***Observation of planet Earth both from space
and from a city level...***

when

From June 17 to July 12, stay tuned!

THE CITY LEVEL

WHEN IS A SMART CITY SMART?

“A smart city is an urban area that uses different types of electronic data collection sensors to supply information which is used to manage assets and resources efficiently.

This includes data collected from citizens, devices, and assets that is processed and analyzed to monitor and manage traffic and transportation systems, power plants, water supply networks, waste management, law enforcement, information systems, schools, libraries, hospitals, and other community services.”



WHERE IS IT WORKING WELL?



Seattle, US

- / Reduced carbon emission on 45% of the building**
- / 800 body cameras for law enforcement officers**
- / ShotSpotter gunshot detection**



Helsinki, Finland

- / **Parking spaces with car charging facilities**
- / **Reduction by 90% of traffic by garbage trucks**
- / **...by automated waste collection system**



Milton Keynes, UK

- / Small city pioneering in UK
- / MotionMap app, leveraging people contribution
- / ...motion of individuals and vehicles in realtime

* often these data are own by telecommunication companies



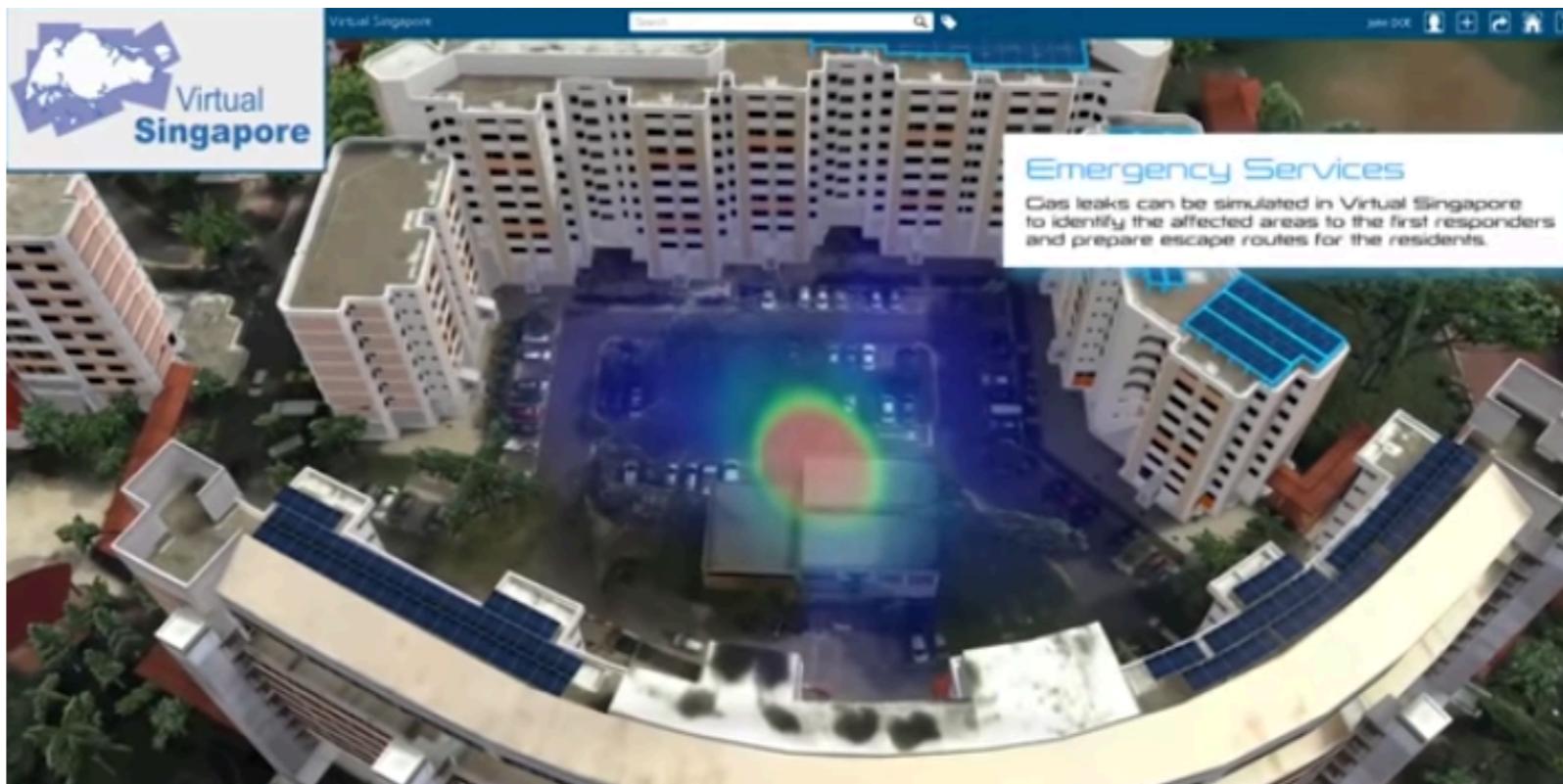
Barcelona, Spain

- / Smart lighting, adapt when someone is passing
- / Real time information on parking and charging stations
- / Free wi-fi in public transportations and public places



Singapore

- / Almost all government services accessible online
- / Mobile app and transport app build for citizens
- / Virtual Singapore: check crowd density, regulate reaction



THE ROLE OF DATA SCIENTISTS

DATA SCIENTISTS THE PROBLEM SOLVERS?



DATA SCIENTISTS THE PROBLEM SOLVERS?

“A data scientist can be conceptualized as a problem solver/solution provider who uses data as his/her primary tool.”

“The role of the Data Scientist within Smart Cities”
De Obeso-Orendain, A., Lopez-Neri, E., Donneaud-Bechelani, C.

DATA SCIENTISTS RESPONSIBILITIES

- / Ensure and promote open access to data**
- / Develop tools for data re-use**
- / Promote the creation of models with a citizen-centric representation of data**
- / Ensure that the right data are used to inform decision-making processes.**

“The role of the Data Scientist within Smart Cities”
De Obeso-Orendain, A., Lopez-Neri, E., Donneaud-Bechelani, C.

A BABEL OF (CODING) LANGUAGES

PRODUCTION

JAVA, C, C++, ...

**DATA-DRIVEN
PROTOTYPE**

PYTHON, R, D3.JS

REFACTORING

**DATA
ENGINEERING**
[SCALA, ...]

... IN → ... OUT

**MACHINE learns ONLY through the training data
(no additional elaboration, no context, ...)**

GARBAGE IN → GARBAGE OUT

Training set:

$$2+2 = 5$$

$$2+2 = 5$$

$$2+2 = 5$$

$$2+2 = 5$$

$$2+2 = 4$$



>>> MACHINE SAYS THAT $2+2 = 5$

... IN → ... OUT

**MACHINE learns ONLY through the training data
(no additional elaboration, no context, ...)**

BIAS IN → BIAS OUT

Training set:

A man from Country X did not return a loan

A woman from Country X did not return a loan

A

**>>> MACHINE DECISION: DENY LOANS TO
PEOPLE FROM COUNTRY X**

THE EXPLAINABILITY ISSUE

LOW EXPLAINABILITY

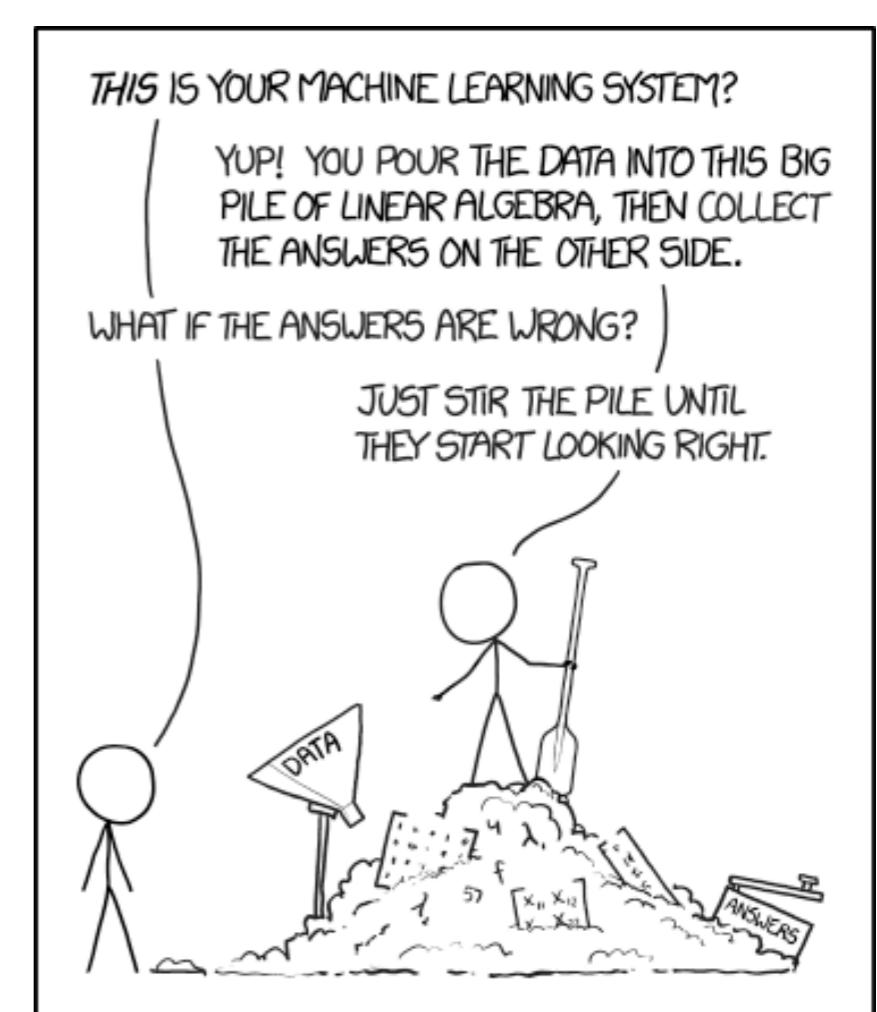


Deep learning

Machine learning

Inferential statistics

HIGH EXPLAINABILITY



**...BUT DATA SCIENTISTS
CAN'T SOLVE EVERYTHING
BY THEIR OWN...**

CHALLENGES OF SMART CITIES

CHALLENGES WITHIN THE COUNCIL OFFICES



“Not really the case in most cities... ”

CHALLENGES WITHIN THE COUNCIL OFFICES

- / Low budget for experimentation**
- / Departments often don't cross**
- / ...so they don't create solution together**
- / ...and decision-making processes are slow or incomplete**

CHARACTERISTICS TO BE CONSIDERED



CHARACTERISTICS TO BE CONSIDERED

- / Emerging or developed economies**
- / Low or high density population**
- / Old and new infrastructures already in place**
- / Natural barriers and cultural heritage**
- / Bureaucracy, country-based laws and taxes**

GOOD PRACTICES

- / **Study successful examples and failures of cities with similar characteristics**
- / **Open to collaborate with different stakeholders aligned with the improvements**
- / **Stay closely in touch with citizens needs and reactions, testing prototypes**

POLICY-MAKING CITIES AND CITIZENS

GDPR IS A BIG IMPROVEMENT... BUT

The purpose specification principle fails to keep pace with developments in technology and serendipity



**"When something online is free, you're
not the customer, you're the product."**

Jonathan Zittrain

THE BIG ISSUE OF PLATFORM REGULATION



Disrupted the hotel industry without owning a single room.

UBER

Disrupted the taxi industry without owning a single car.

Google

facebook

amazon

GOOD PRACTICES

I. EXTRACTING INFORMATION **VS** BUILDING PARTICIPATION THROUGH DATA



CONTROL ROOM

The screenshot shows a website header with the GOVLAB logo and navigation menus. Below the header, there is a yellow banner with the text 'DATA COLLABORATIVES' and 'CREATING PUBLIC VALUE BY EXCHANGING DATA'. A small geometric logo is visible on the left side of the banner. The main content area has a dark background with blurred lights and contains the text 'WHAT ARE DATA COLLABORATIVES' and a detailed description of what data collaboratives are.

DATA COLLABORATIVES
CREATING PUBLIC VALUE BY EXCHANGING DATA

WHAT ARE DATA COLLABORATIVES

Data Collaboratives are a new form of collaboration, beyond the public-private partnership model, in which participants from different sectors—in particular companies—exchange their data to create public value.

DATA COLLABORATION

GOOD PRACTICES

II. RETHINKING THE PUBLIC ROLE

**Public institutions and Governments
should focus on:**

- / COMMUNITIES OVER MONOPOLIES**
- / RESILIENCE OVER OPTIMIZATION**
- / PARTICIPATION OVER CONTROL**
- / DISTRIBUTION OVER SINGULARITIES**

GOOD PRACTICES

III. REDISTRIBUTING DATA OWNERSHIP

DECENTRALIZATION

is the new mantra



You choose how you produce, own, manage and share data

"Ubiquitous Commons: How To Regain Ownership Of Your Data In The Internet Of Things Era"

— Forbes Magazine

Features

These are the principal features of Ubiquitous Commons, designed to empower subjects of all kinds to own their data and enable ethical usages which go to the advantage of communities, research, social enterprises, public administrations and more.



Identity System



Blockchain



Controlled Open Data

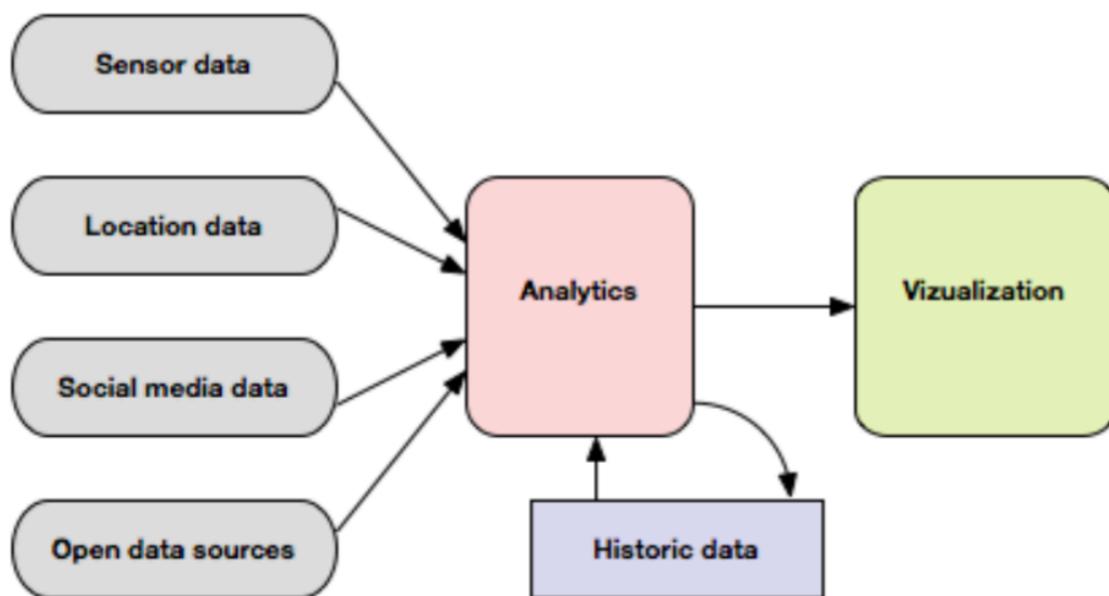
GOOD PRACTICES

IV. RESEARCH ON ANALYTICAL FRAMEWORKS

ICDS 2018 : The Twelfth International Conference on Digital Society and eGovernments

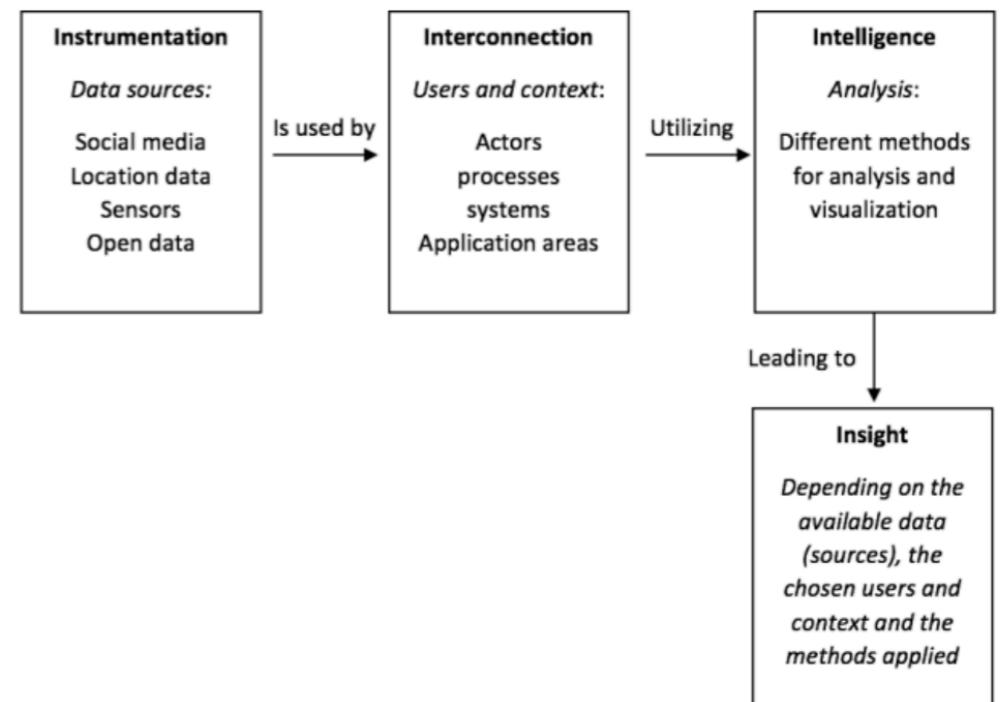
Smart Cities, Big Data and Smart Decision-making

Understanding “Big Data” in Smart City Applications



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University College of Southeast Norway
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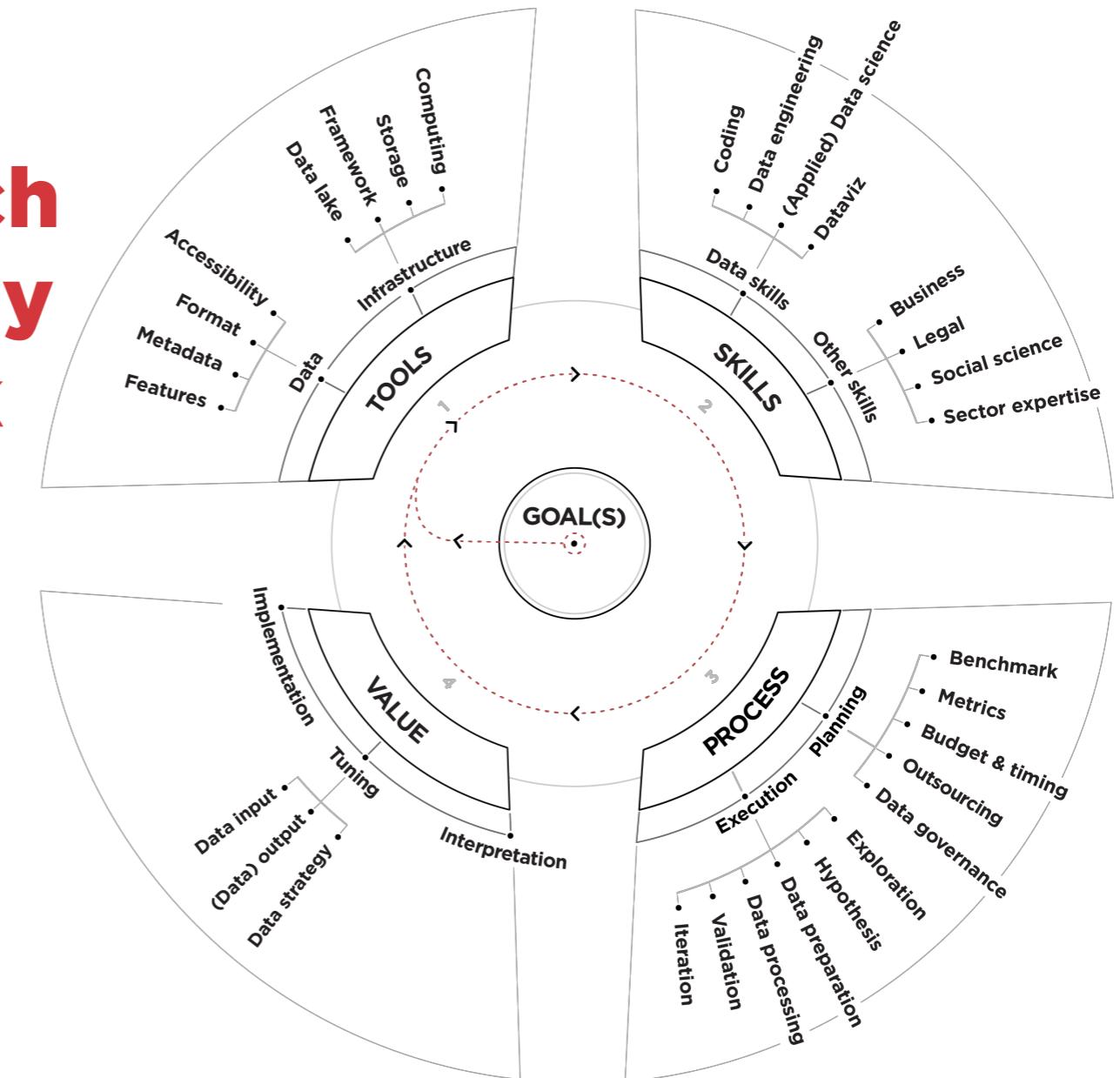
Rania El-Gazzar
Department of Business and Law
University College of Southeast Norway
Hønefoss, Norway
e-mail: rania.el-gazzar@usn.no



GOOD PRACTICES

V. FORCING COMPREHENSIVE DESIGN

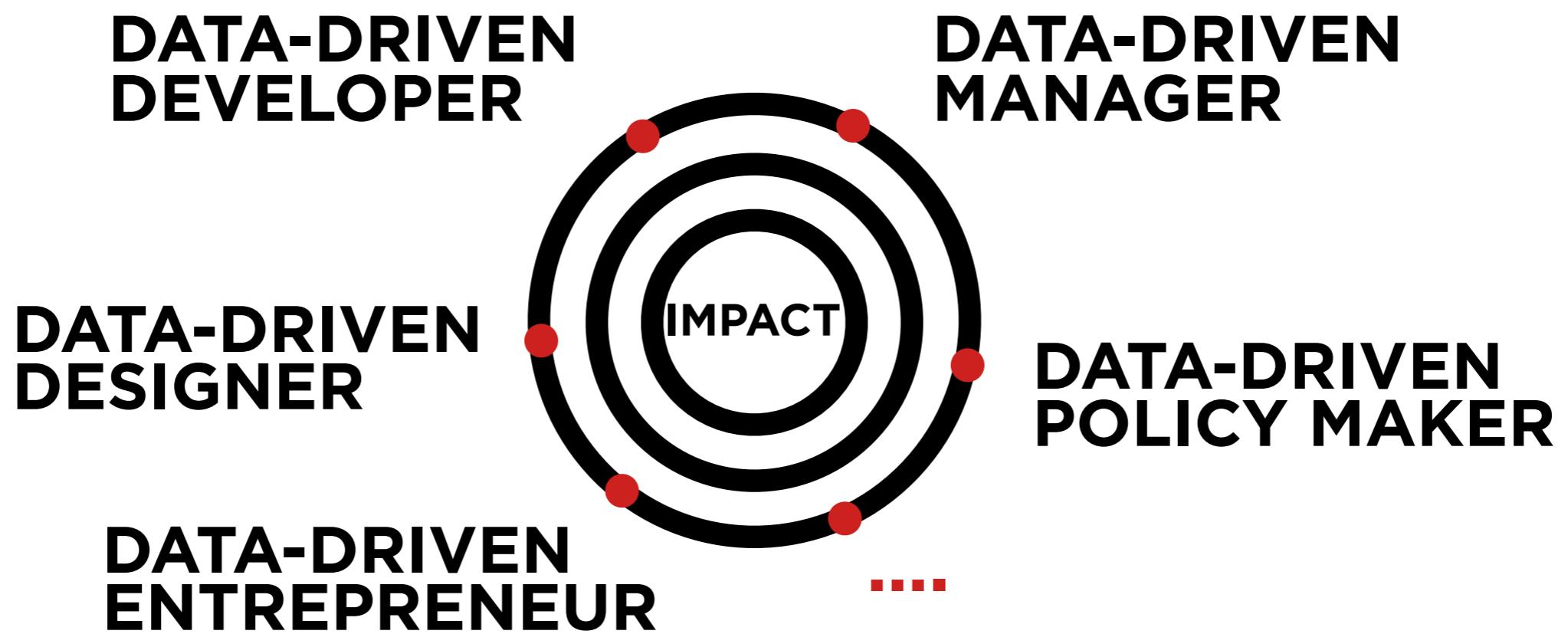
We need a “new”
eco-systemic approach
to embrace complexity
and to reduce the risk
of being ineffective
in real data-driven
applications



<http://dataring.eu/>

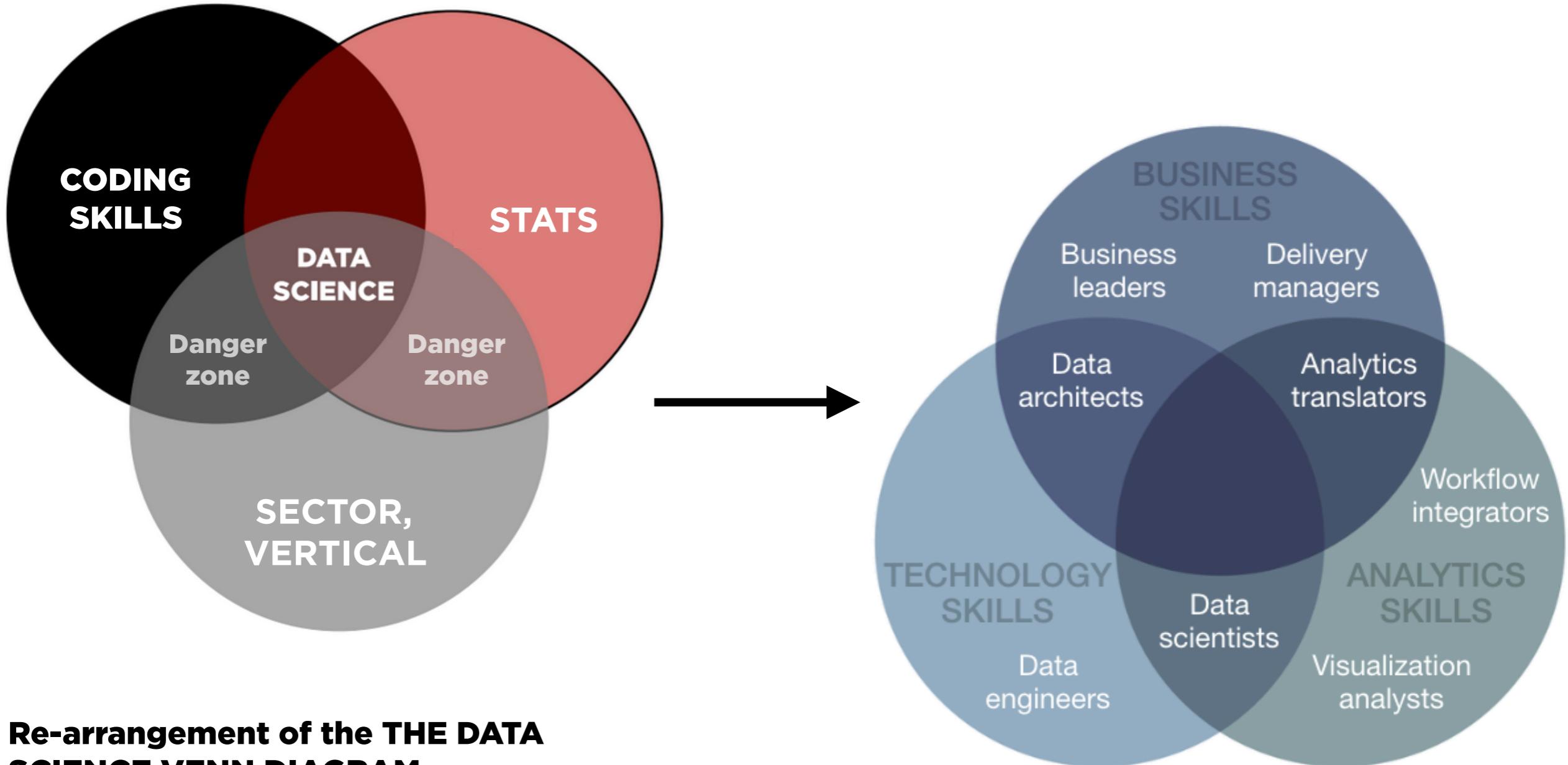
THE COMPLETE DATA TEAM

WE NEED DATA-DRIVEN TEAM



SINGLE VS TEAM

FROM UNICORNS TO DATA TEAM



**Re-arrangement of the THE DATA
SCIENCE VENN DIAGRAM**
by Drew Conway

McKinsey&Company

THE DATA TEAM

Data Mining
Statistics
ML / DL
NLP

SCIENCE

Coding
DB
Engineering
DataViz

TECH

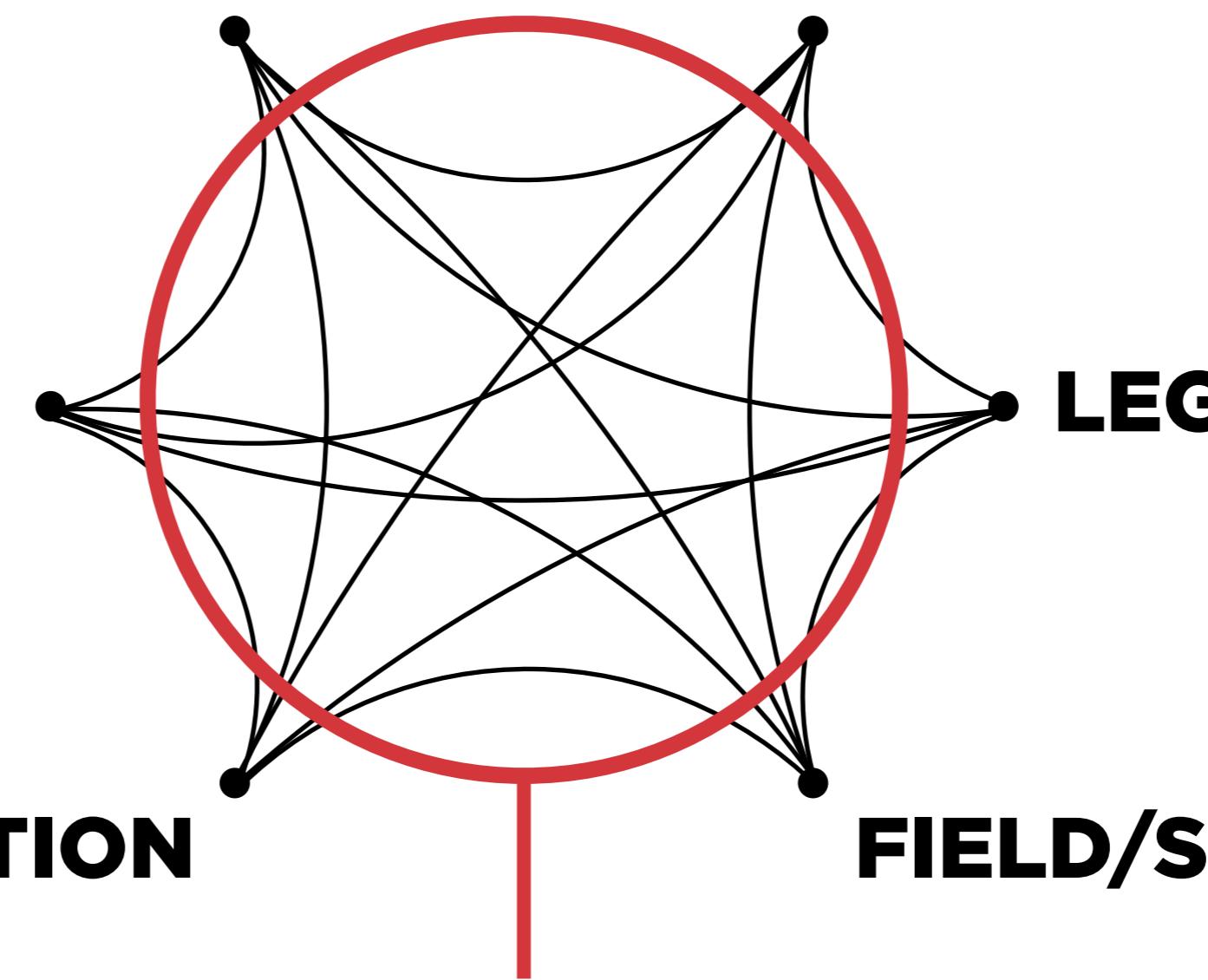
Creativity
Problem solving
Lean Agile
Scientific

APPROACH

TRANSLATION

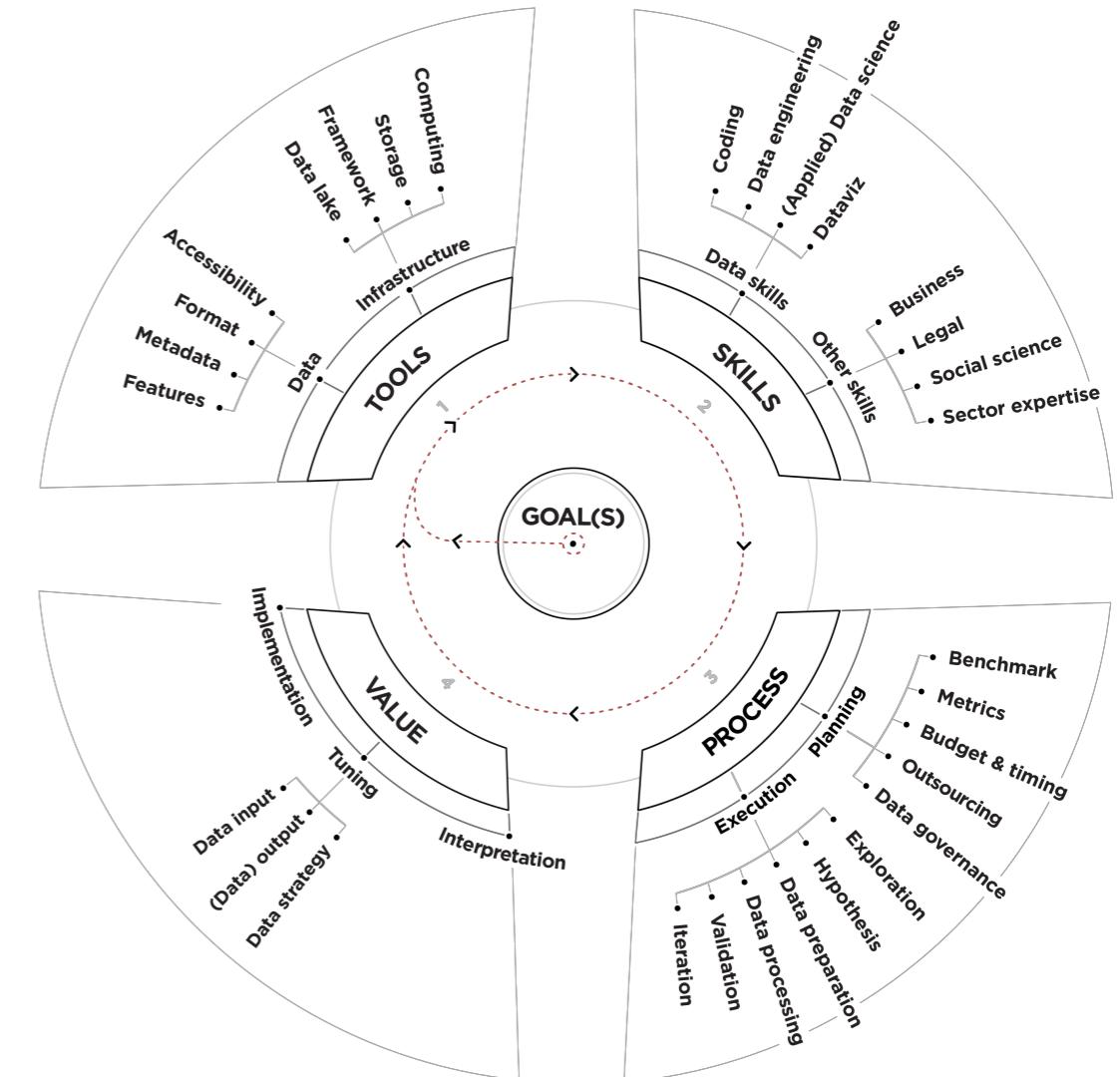
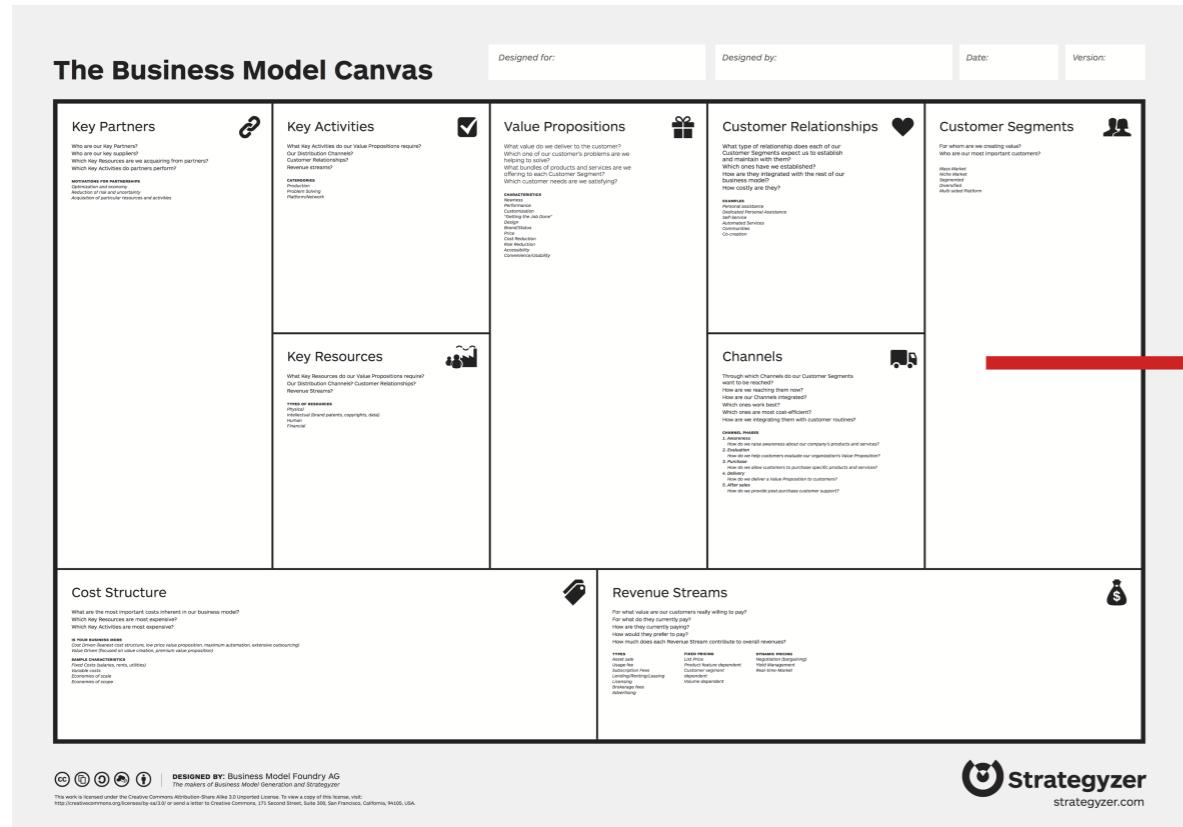
FIELD/SECTOR

THE DATA TEAM



THE DATA RING

THE CANVAS APPROACH



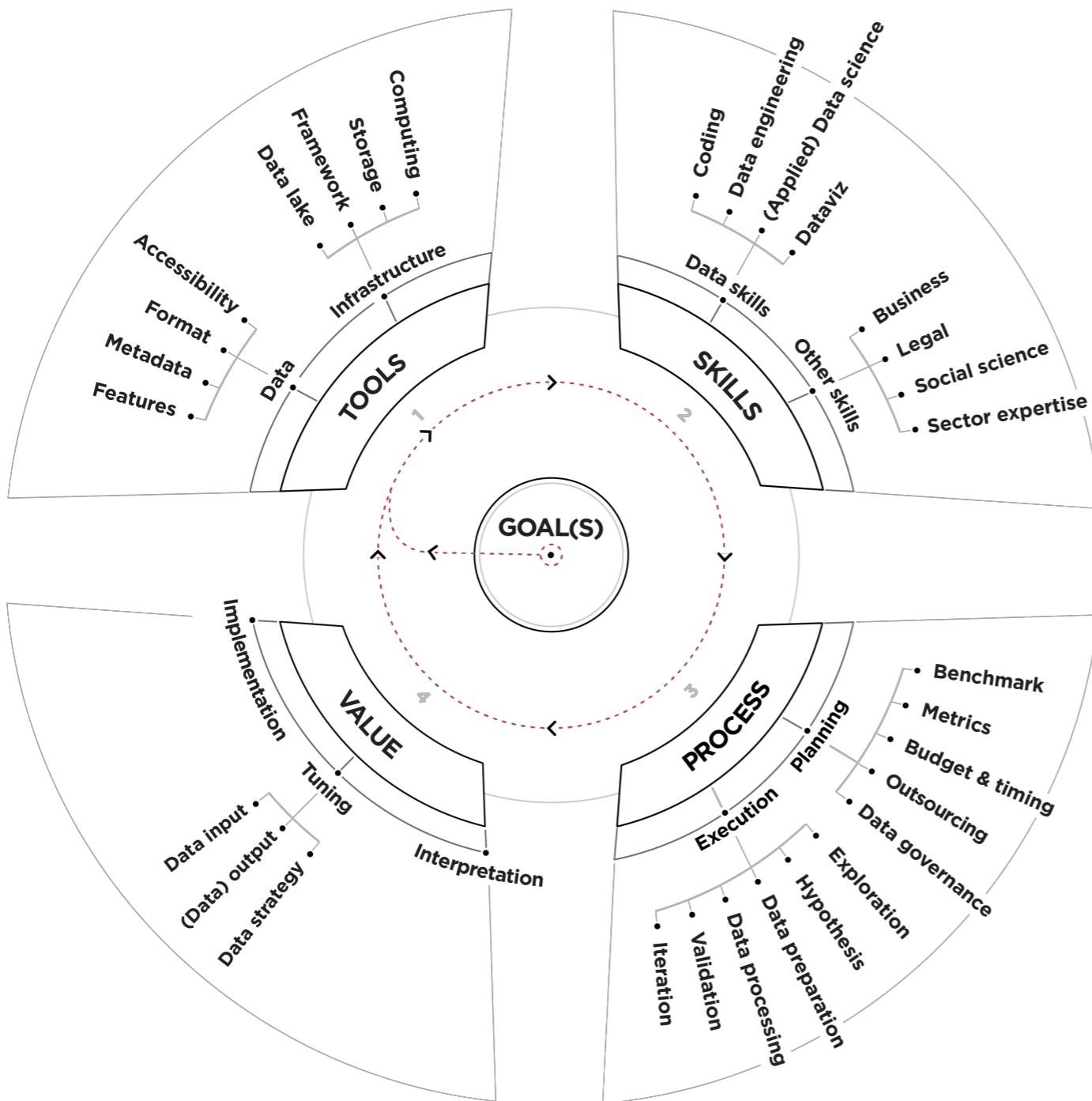
The inspiring precursor

The Data Ring

WHY A CANVAS ?

- / It forces the project owner to state crystal clear the **value proposition** of the project.
- / It is an analytical tool, devoted to **self-diagnosis** and to define and respect an internal strategy.
- / It provides for a complete representation of the process that can be explained to **third parties** too.
- / It is not a “static shot” but it **evolves through time** according to project evolution.
- / It is not the solution but it helps to **reduce failure risk**.

THE DATA RING



[**http://dataring.eu**](http://dataring.eu)

by Christian Racca,
Leonardo Camiciotti
and Laura Pippinato



The Data Ring Canvas

Project name:

Designed by:

Date:

Version:



The Data Ring Canvas

Project name:

Designed by:

Date:

Version:



**LET'S
PLAY WITH
THE DATA RING**

CITY 1: “THE NEW OFFICE”

- / **City type** Medium size, medium density, old buildings and offices.
- / **Problem** Internal processes are storing new data and old paperwork to be converted in a digital format. Need to store, analyse, and share data in a format usable for the public. Reduce long queues for public services.
- / **Technologies** ML, NLP.
- / **Core team** Data engineer, Data scientist, Layer, Administrative Services Managers, Citizen(s).
- / **Additional team** Public Administration Consultant, Customer service.

CITY 2: “MIND THE STREET”

/ **City type** Close to a river, old infrastructure, medium size, high density.

/ **Problem** Traffic on main streets and bridges, high risk of flood and high rate on collisions in some crossing. Need to gather the data from sensors around the city analyse and visualise them in service of the public to improve services and increase awareness.

/ **Technologies** ML, Deep Learning, IoT.

/ **Core team** Data engineer, Data scientist, Crawler developer, City Manager, Major, Citizen(s).

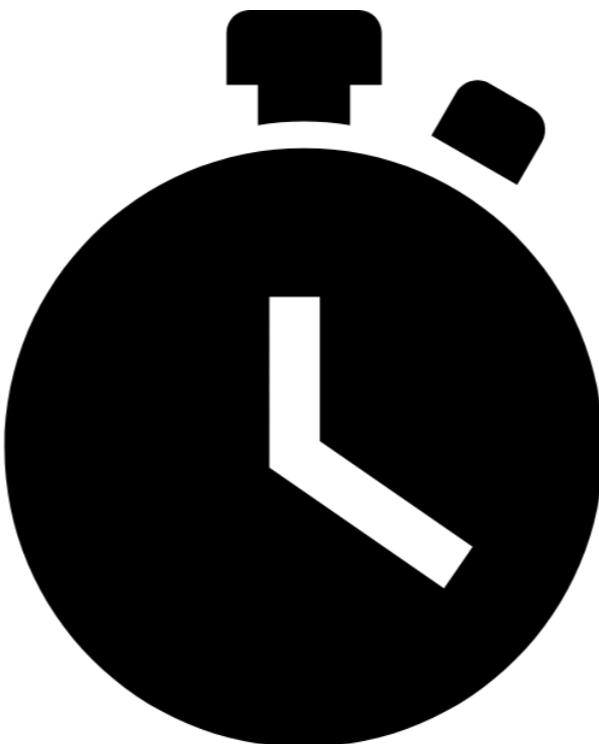
/ **Additional team** Research Associate.

CITY 3: “YOU'RE WELCOME!”

- / **City type** Capital city, big size, high density.
- / **Problem** Refugees/migrants and advisors are challenged to find the best housing and training available, Need to help refugee find the best place to live and get a job that fits with their skills and interests.
- / **Technologies** ML, Deep learning.
- / **Core team** Data engineer, Data scientist, Program Director, Public Service Employees Network, Citizen(s) from different countries.
- / **Additional team** Education Administrators.

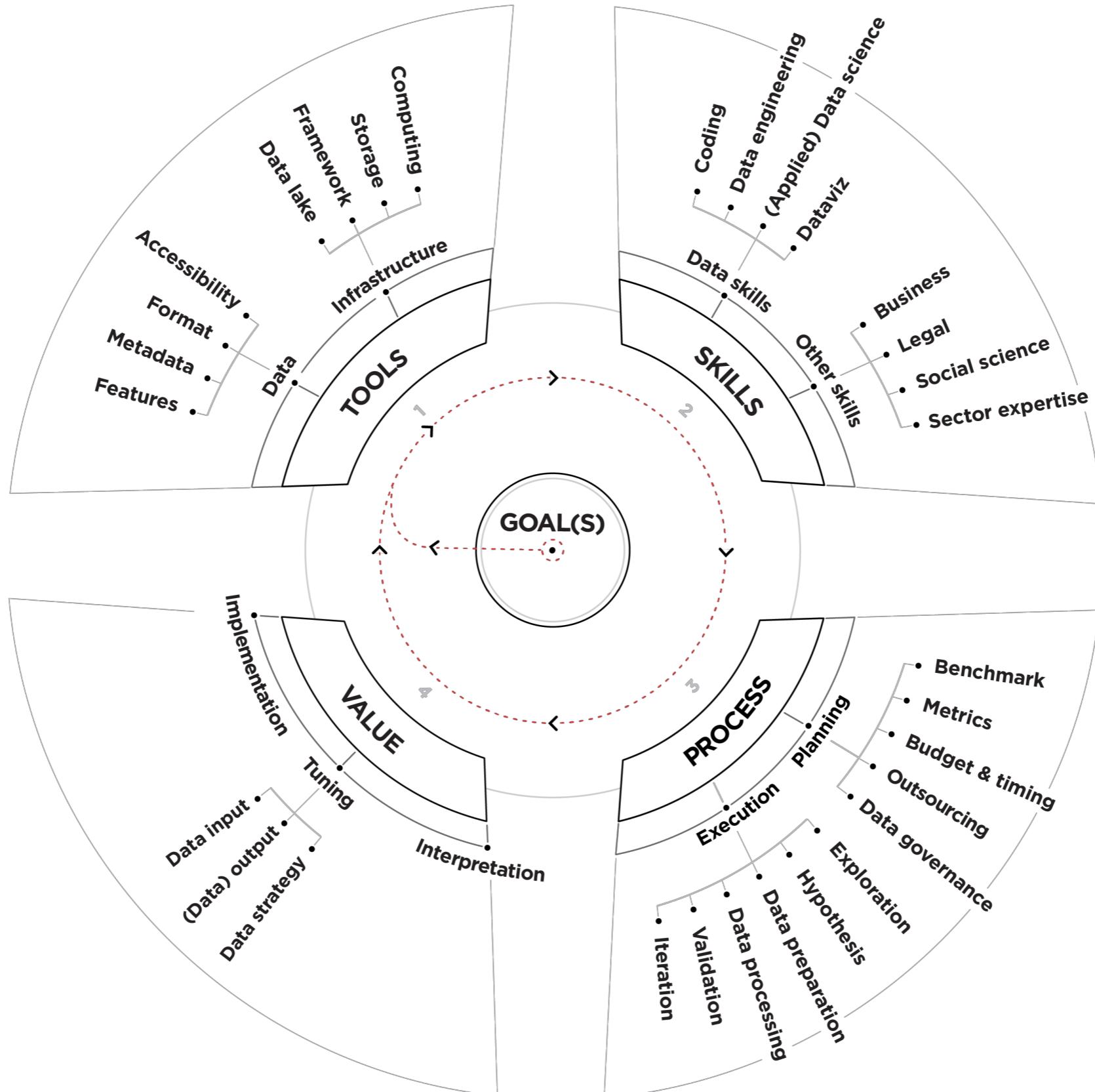
LET'S CREATE THE TEAMS!

**YOU'LL BE GUIDED TO FILL UP
THE DATA RING SECTIONS**

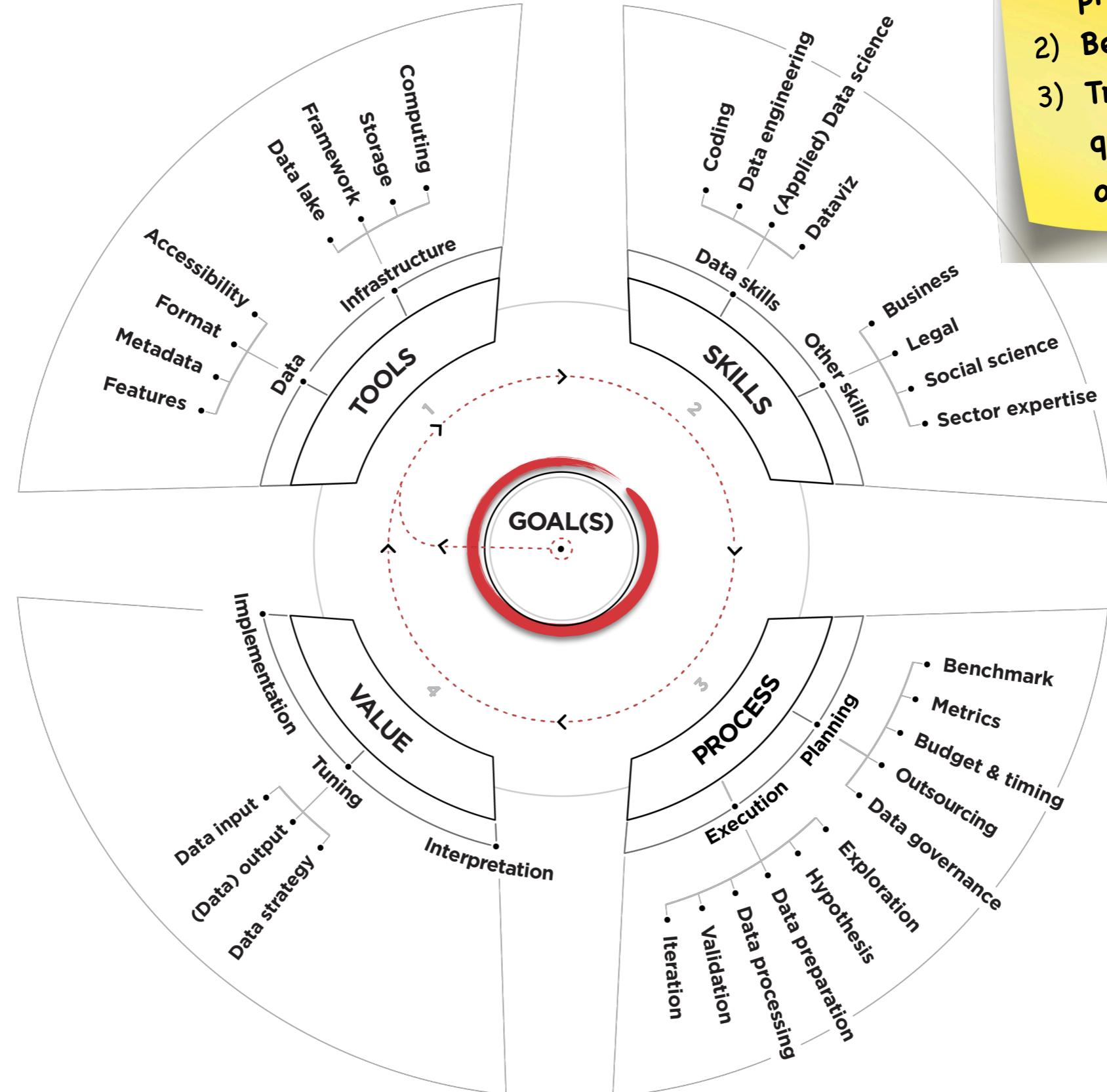


<https://www.timeanddate.com/countdown/create>

DATA RING CANVAS EXPLAINED



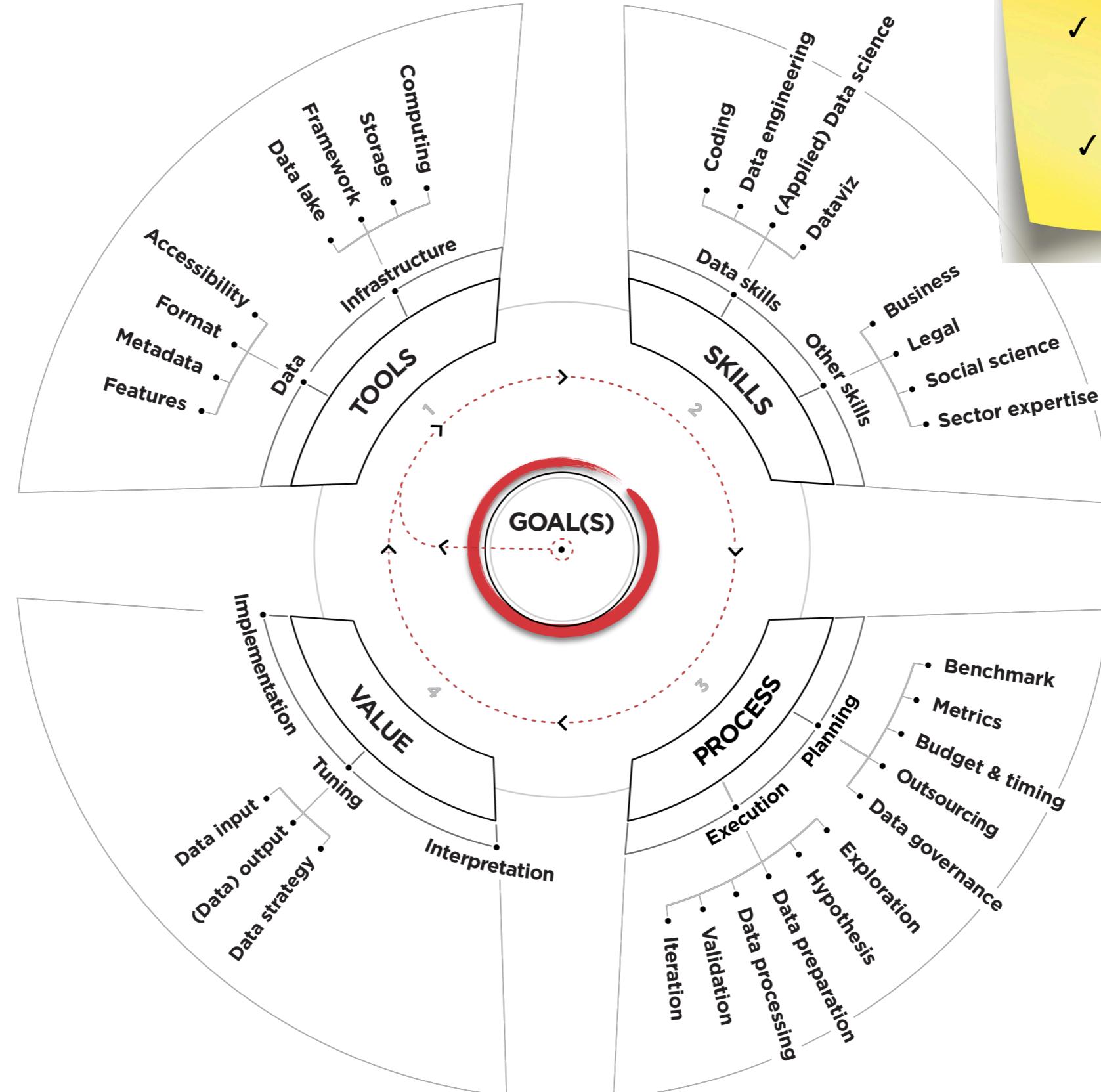
GOAL(S) SETTING



BEST PRACTICES:

- 1) Start from the problem-setting
- 2) Be specific!
- 3) Try to be quantitative (not only qualitative)

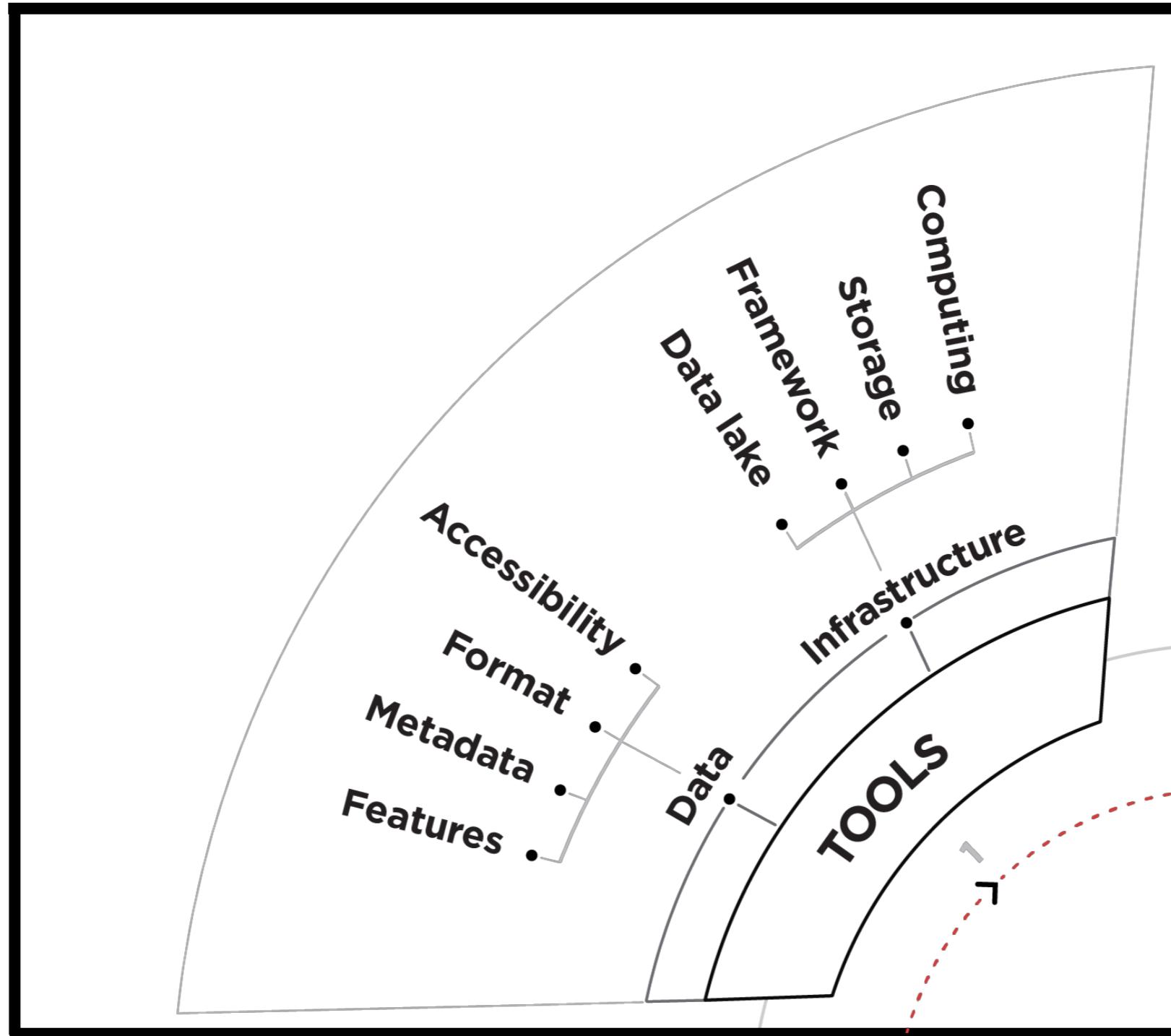
GOAL(S) SETTING



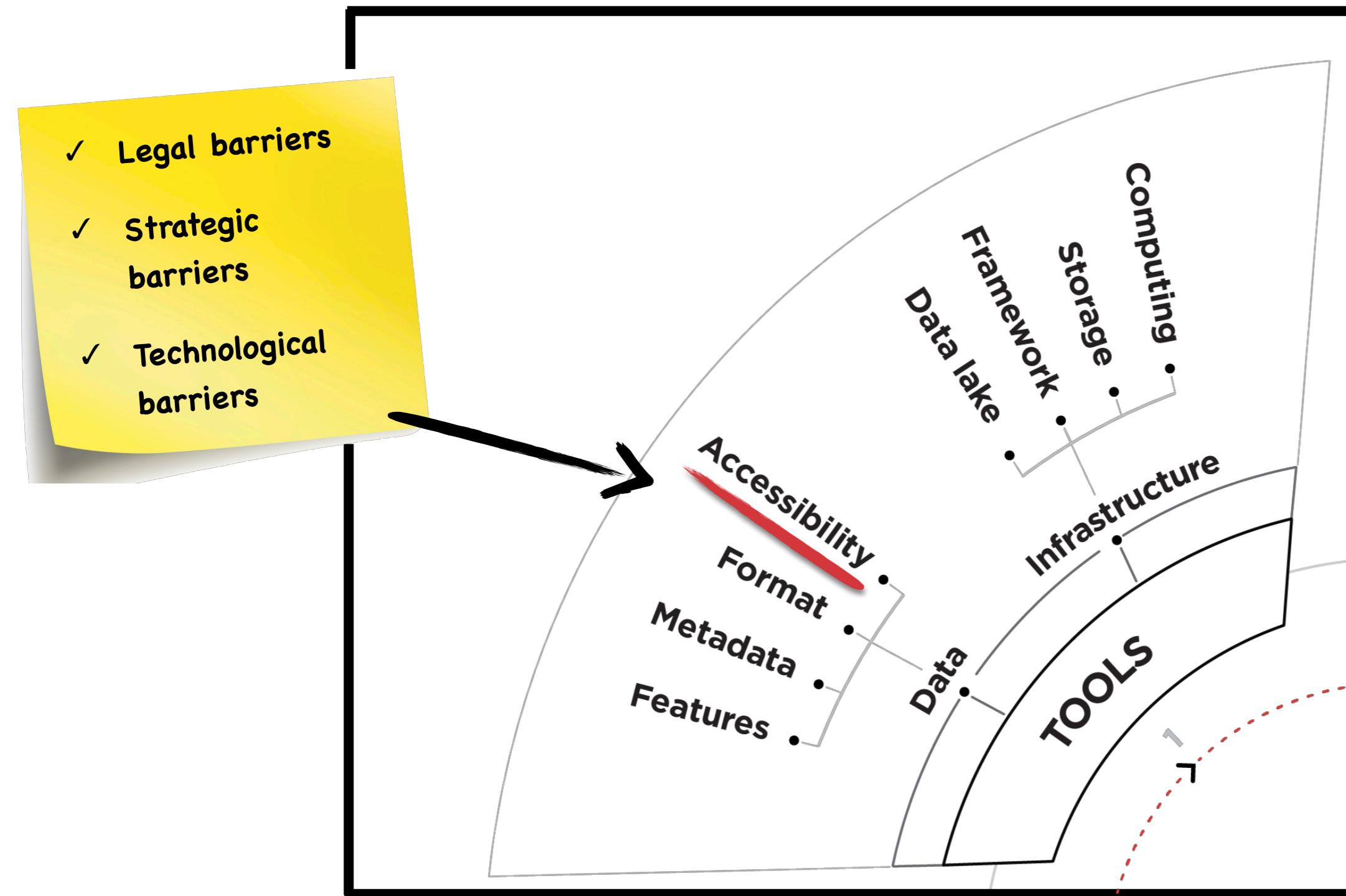
RISKS

- ✓ LACK OF FOCUS
- ✓ TORTURED GOALS
- ✓ NOT PRAGMATIC GOALS

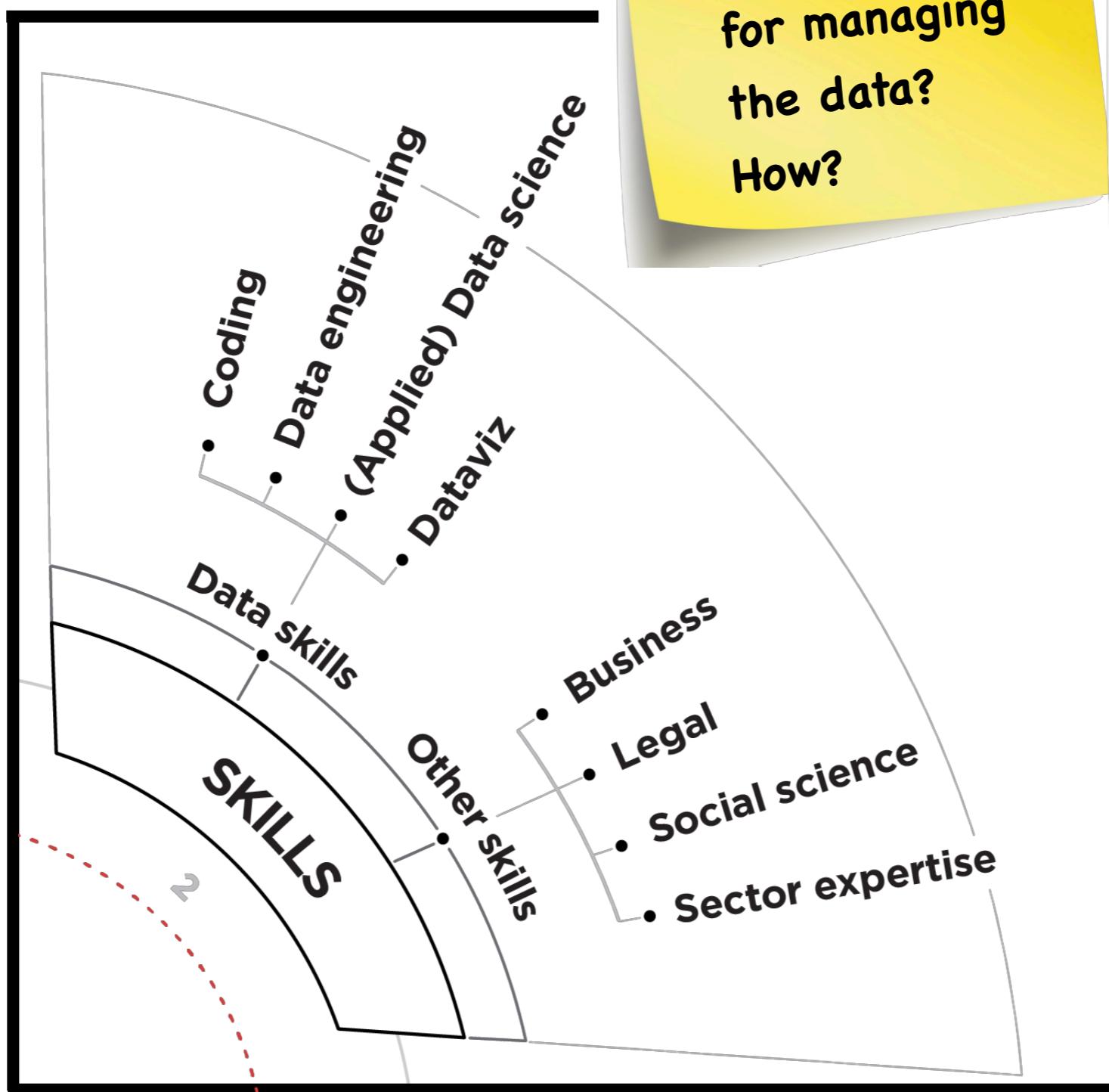
TOOLS



TOOLS



SKILLS



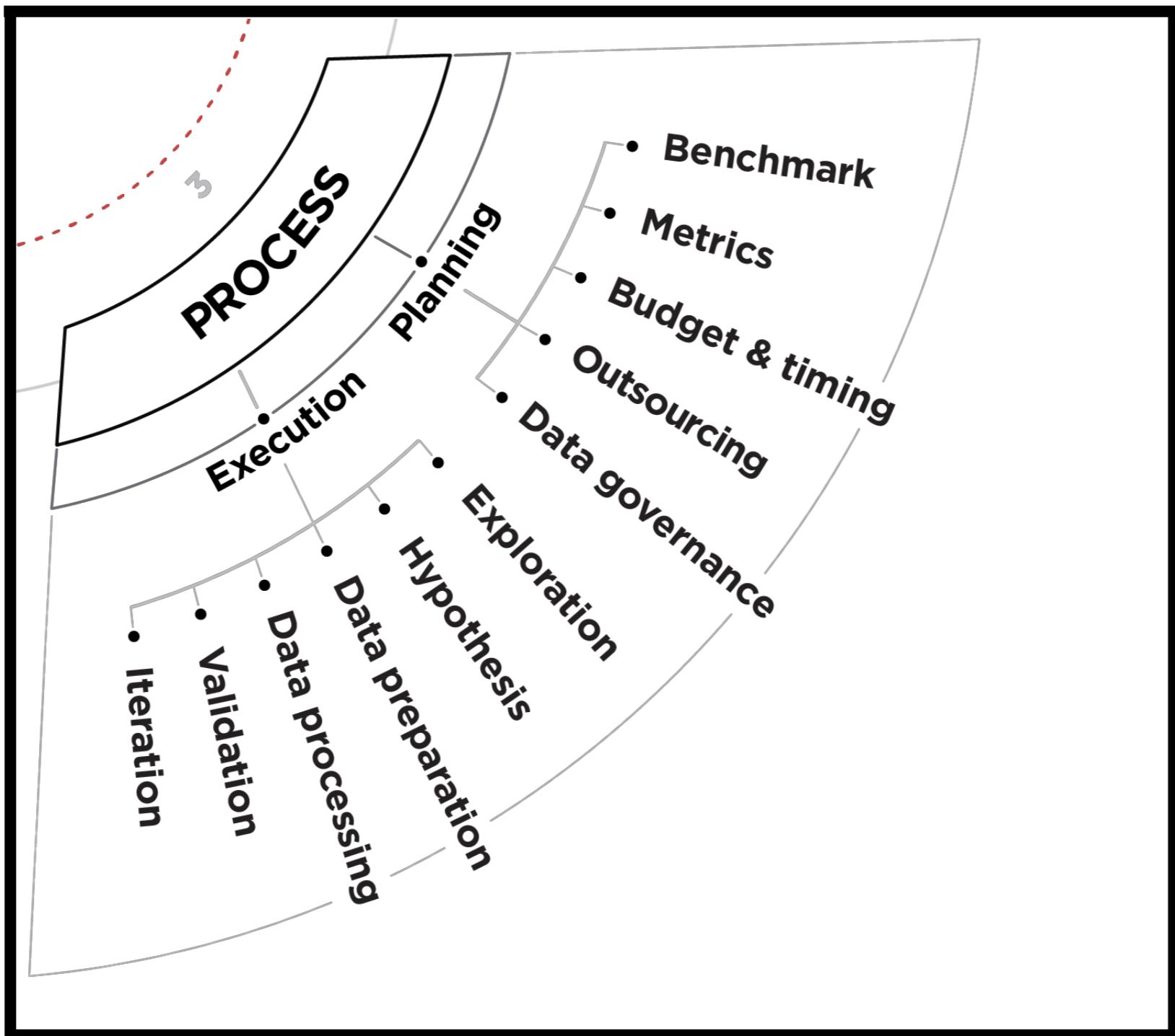
Who is responsible for managing the data?
How?

How do you ensure scientific validation?

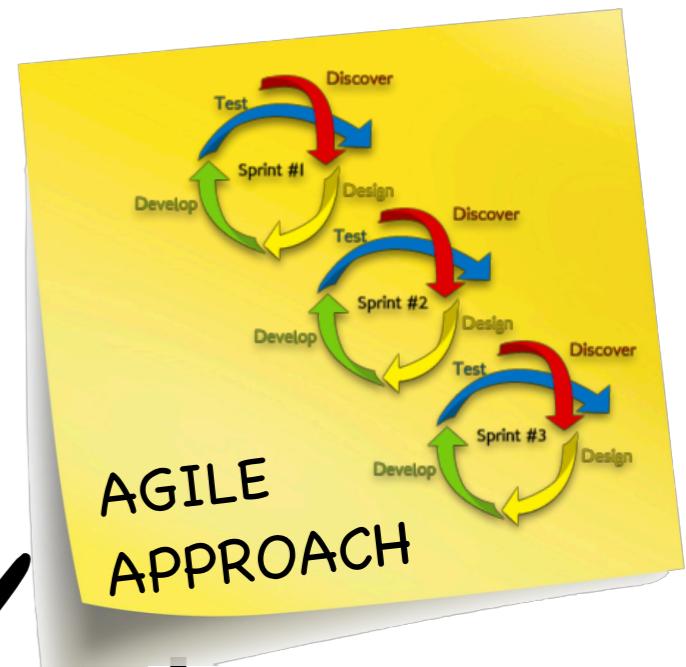
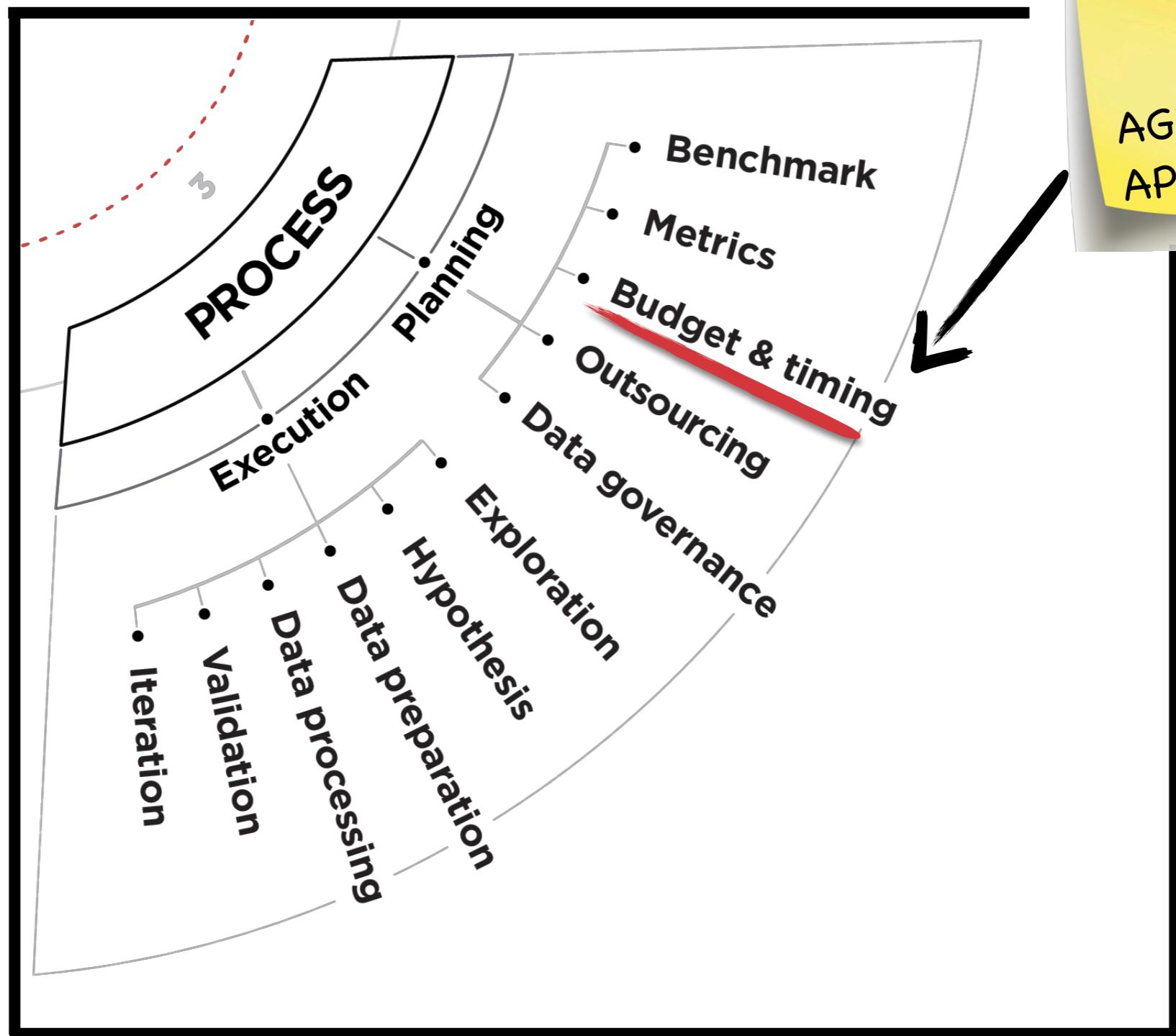
Which are your recruiting channels?

Is there a collaboration between the data team and other business units?

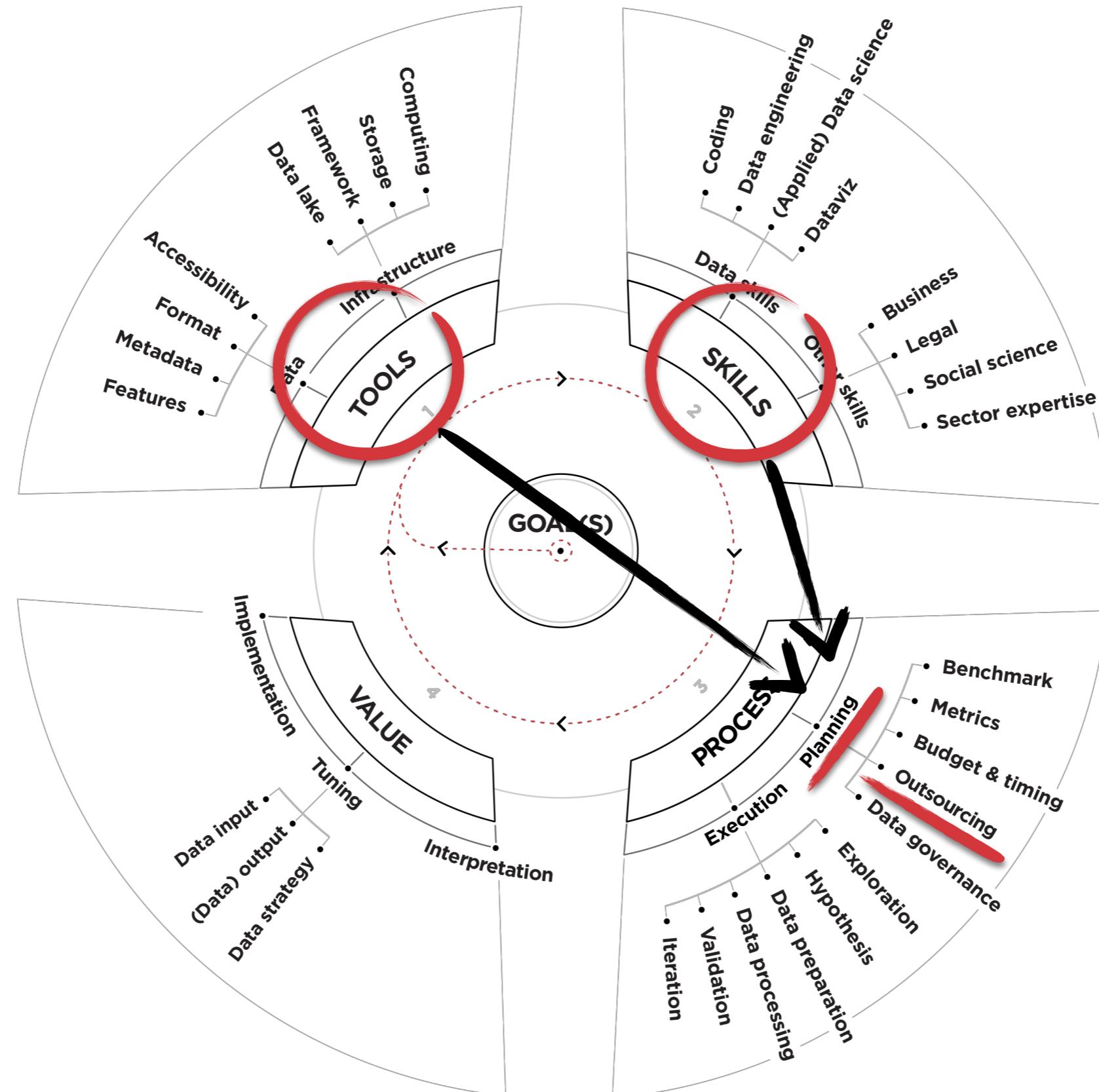
PROCESS



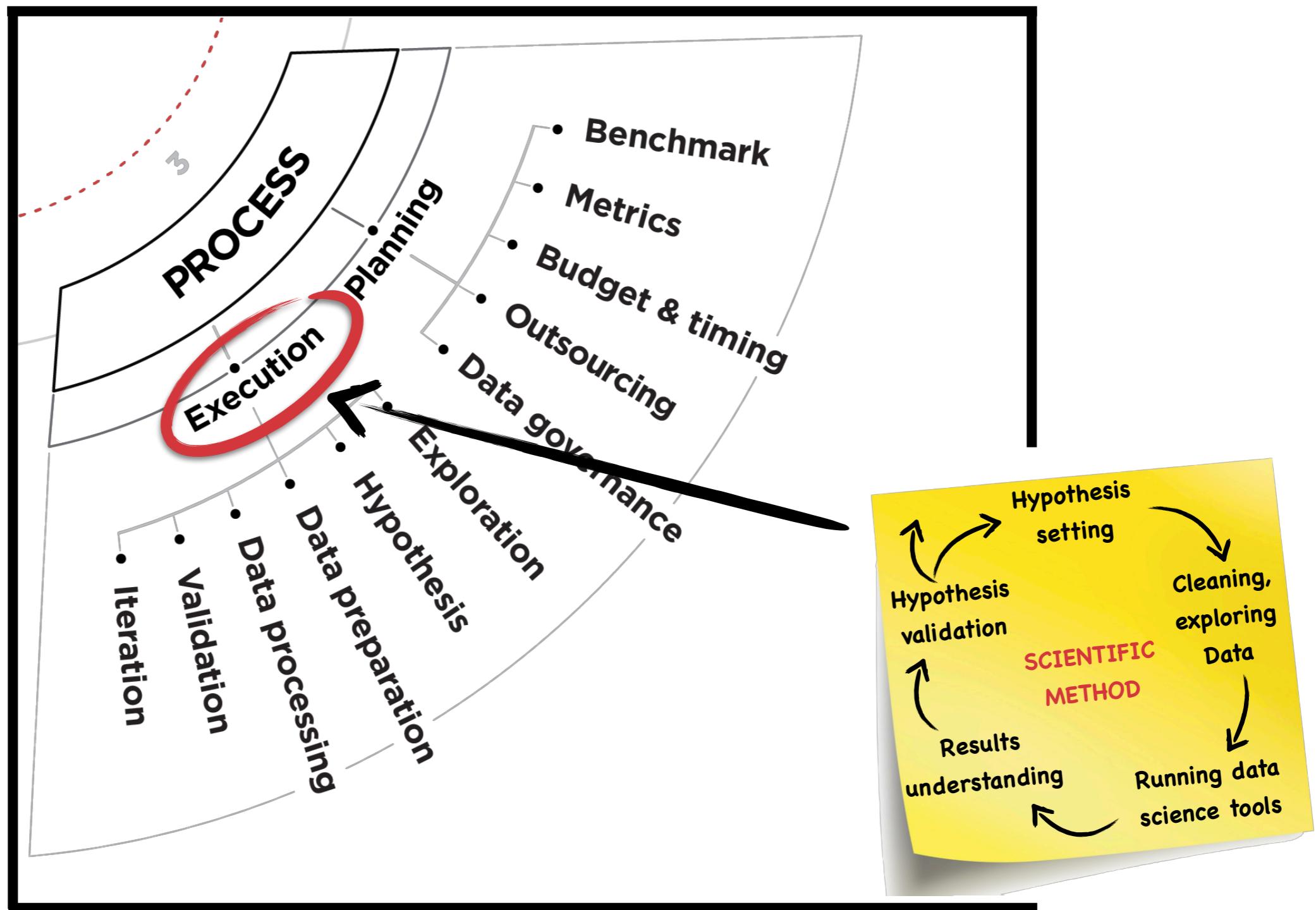
PROCESS



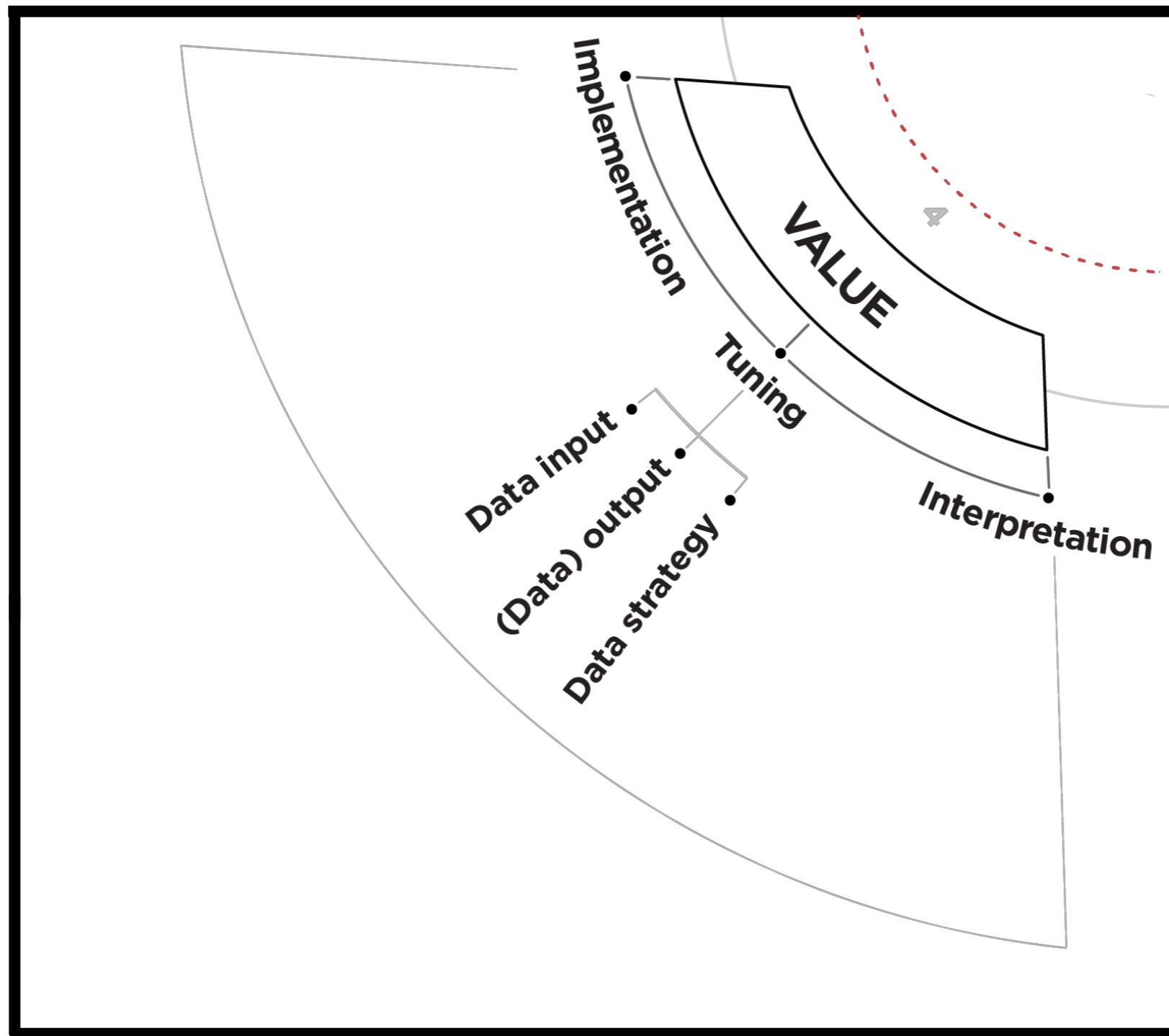
PROCESS



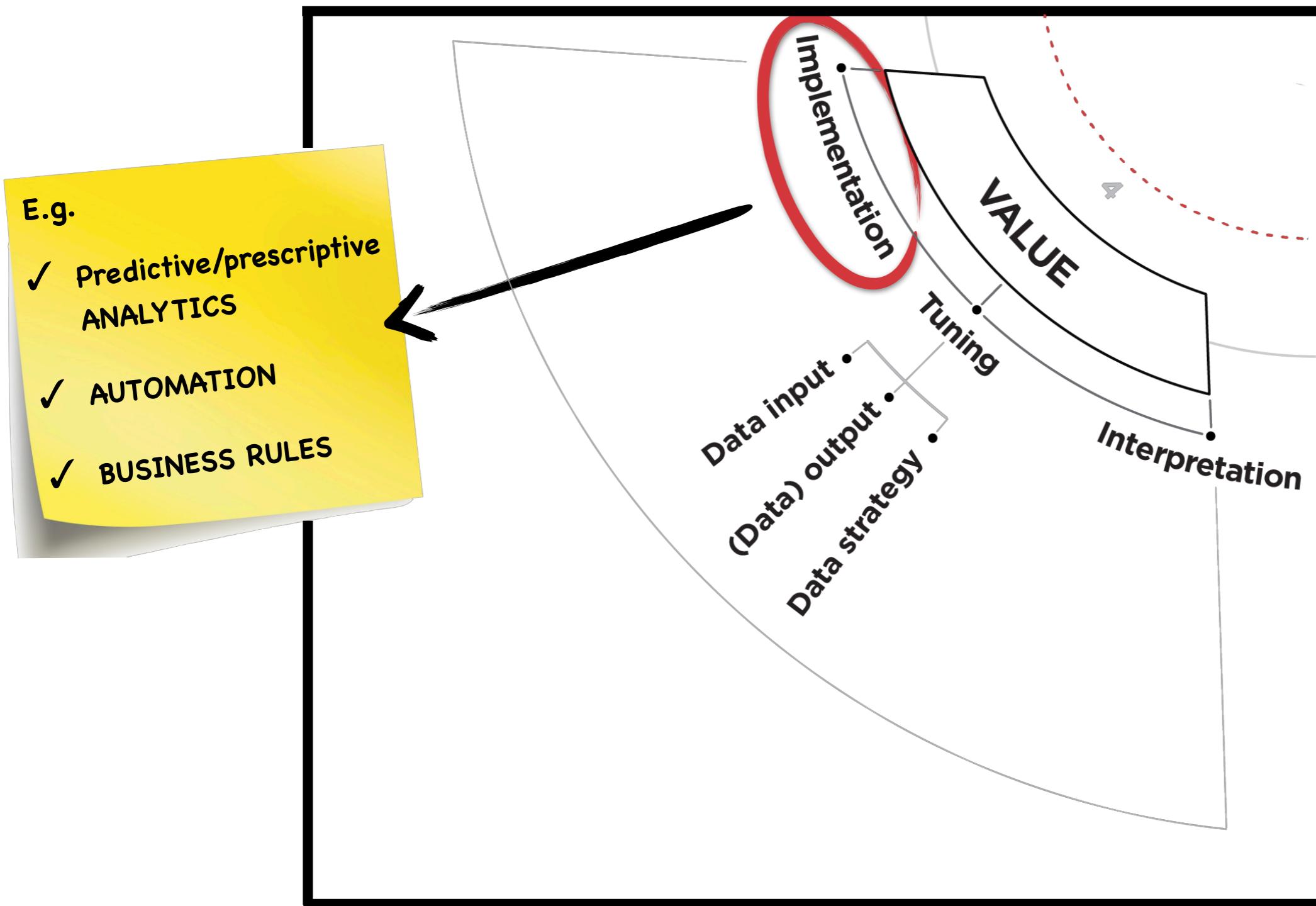
PROCESS



VALUE



VALUE



KIND OF PROBLEMS YOU CAN AVOID

- i. Discovering massive lack of data or bad quality when it's too late.
- ii. Being stopped by tech lock-in, or legal constraints.
- iii. Creating un-effective P.o.C.
- iv. Developing data-tools that can't be shipped or deployed in-production.
- v. Defining “ex-post” the generated impact.
- vi. Underestimating skills, training and gaps.

KIND OF PROBLEMS YOU CAN'T AVOID



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THANKS!