

partly **FAIR**, partly **Cloudy**

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Leiden University Medical Center
Dutch Techcenter for Life Sciences
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Chair: HLEG-EOSC



Realising the European Open Science Cloud

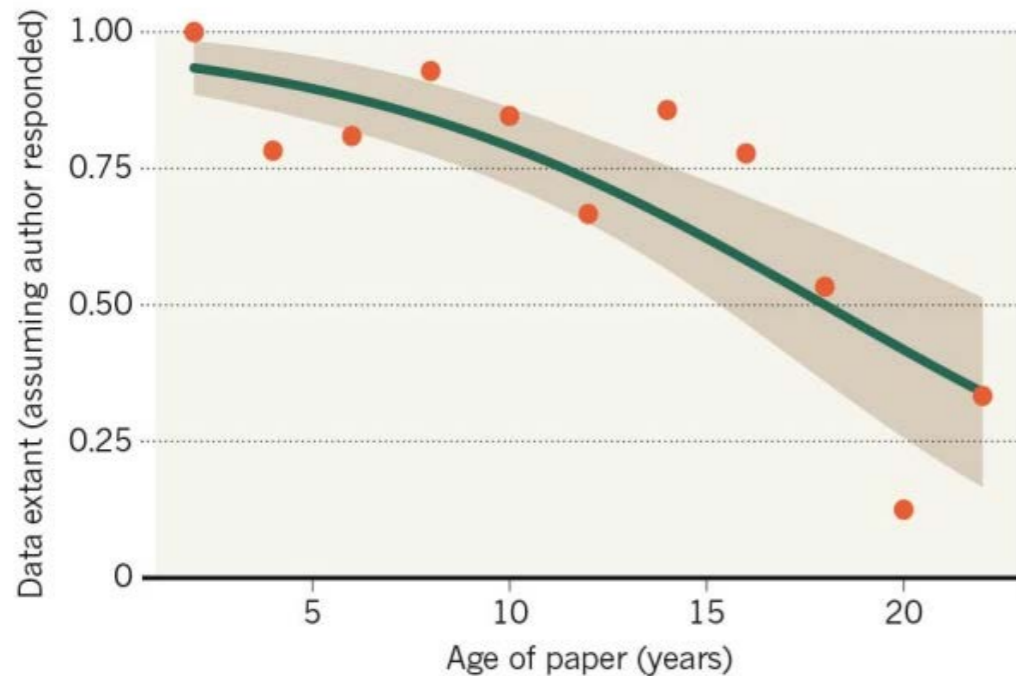
First report and recommendations
of the Commission High Level Expert Group
on the European Open Science Cloud

<http://ec.europa.eu/research/openscience/index.cfm?pg=open-science-cloud>

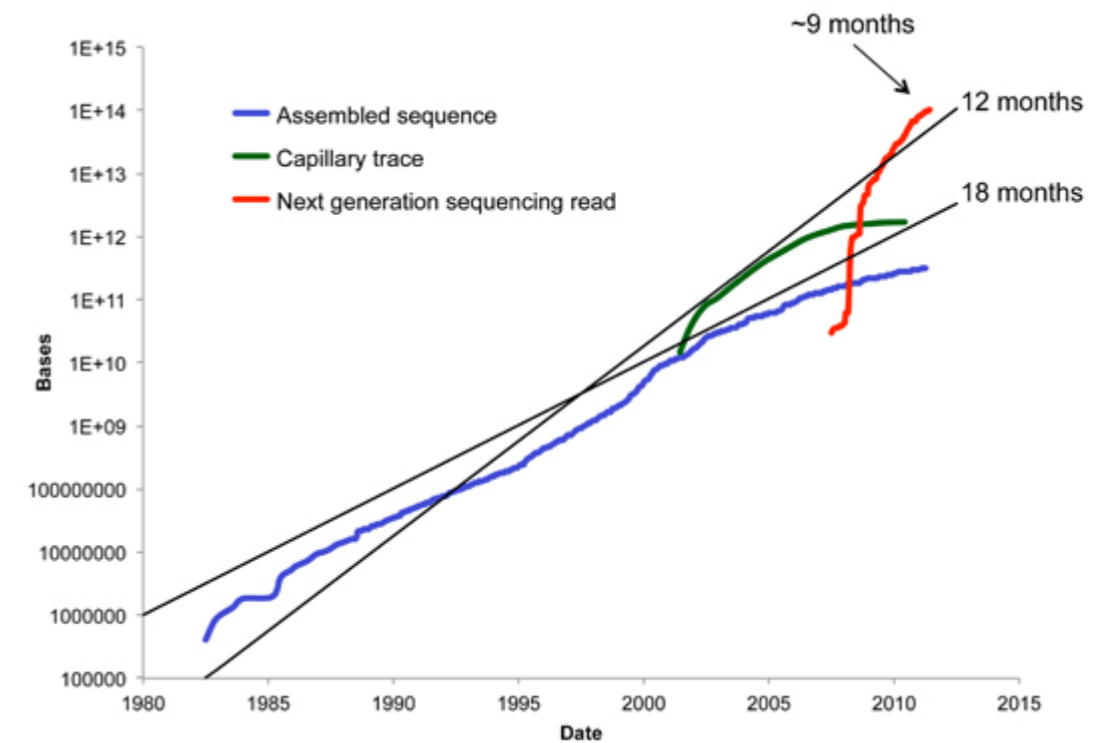
Data loss is real and significant, while data growth is staggering

MISSING DATA

As research articles age, the odds of their raw data being extant drop dramatically.



Nature news, 19 December 2013



- Computer speed and storage capacity is **doubling every 18 months** and this rate is steady
- DNA sequence data is **doubling every 6 months** over the last 3 years and looks to continue for this

80%



reuse

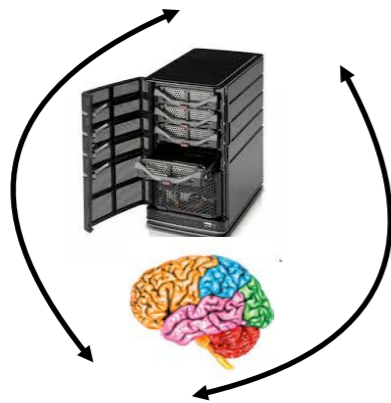
'Oops, that link was the laptop of my PhD student'

something to refer to

<http://www.nature.com/articles/sdata201618>

Open
data
is about
MORE
THAN
DISCLOSURE
it must be
Fair

- Findable
- Accessible
- Interoperable
- Reusable



Altmetric: 375 Views: 23,843 Citations: 5 [More detail >>](#)

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The FAIR Guiding Principles for scientific data management and stewardship

Mark D. Wilkinson, Michel Dumontier [...] Barend Mons [✉](#)

Abstract

There is an urgent need to improve the infrastructure supporting the reuse of scholarly data. A diverse set of stakeholders—representing academia, industry, funding agencies, and scholarly publishers—have come together to design and jointly endorse a concise and measurable set of principles that we refer to as the FAIR Data Principles. The intent

Data Consumers



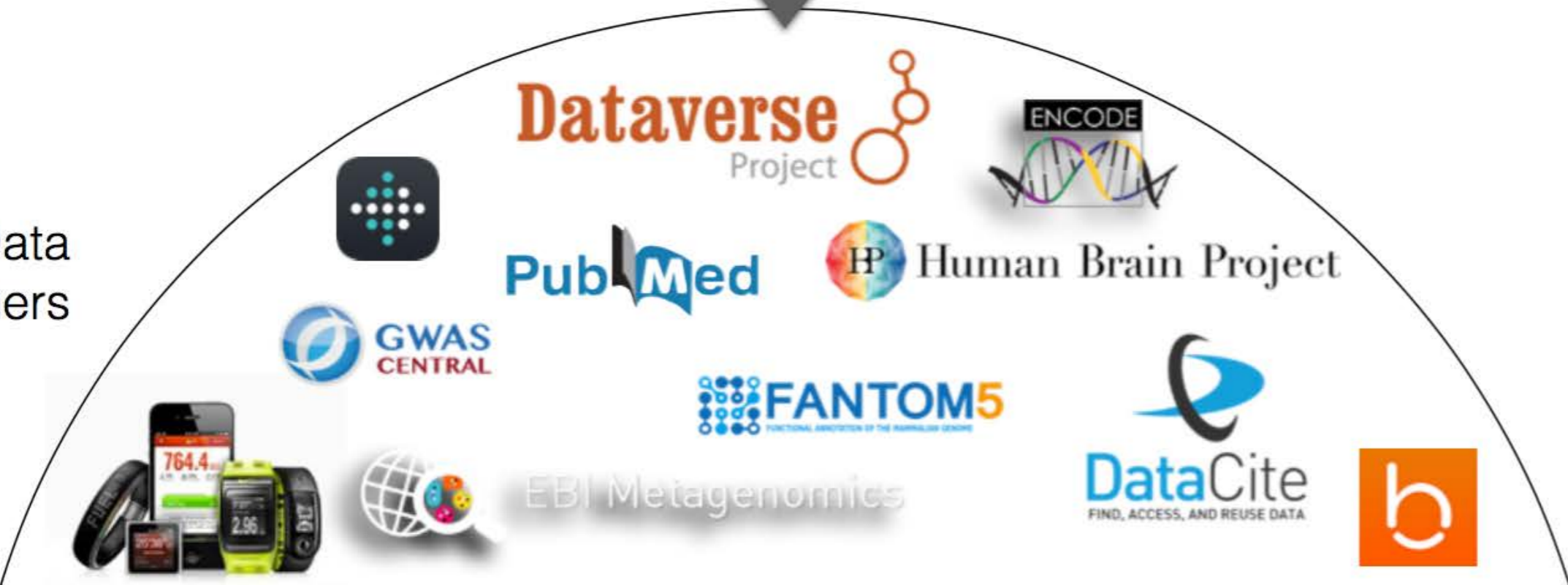
3rd Party Application & Services



Interoperable Data Layer

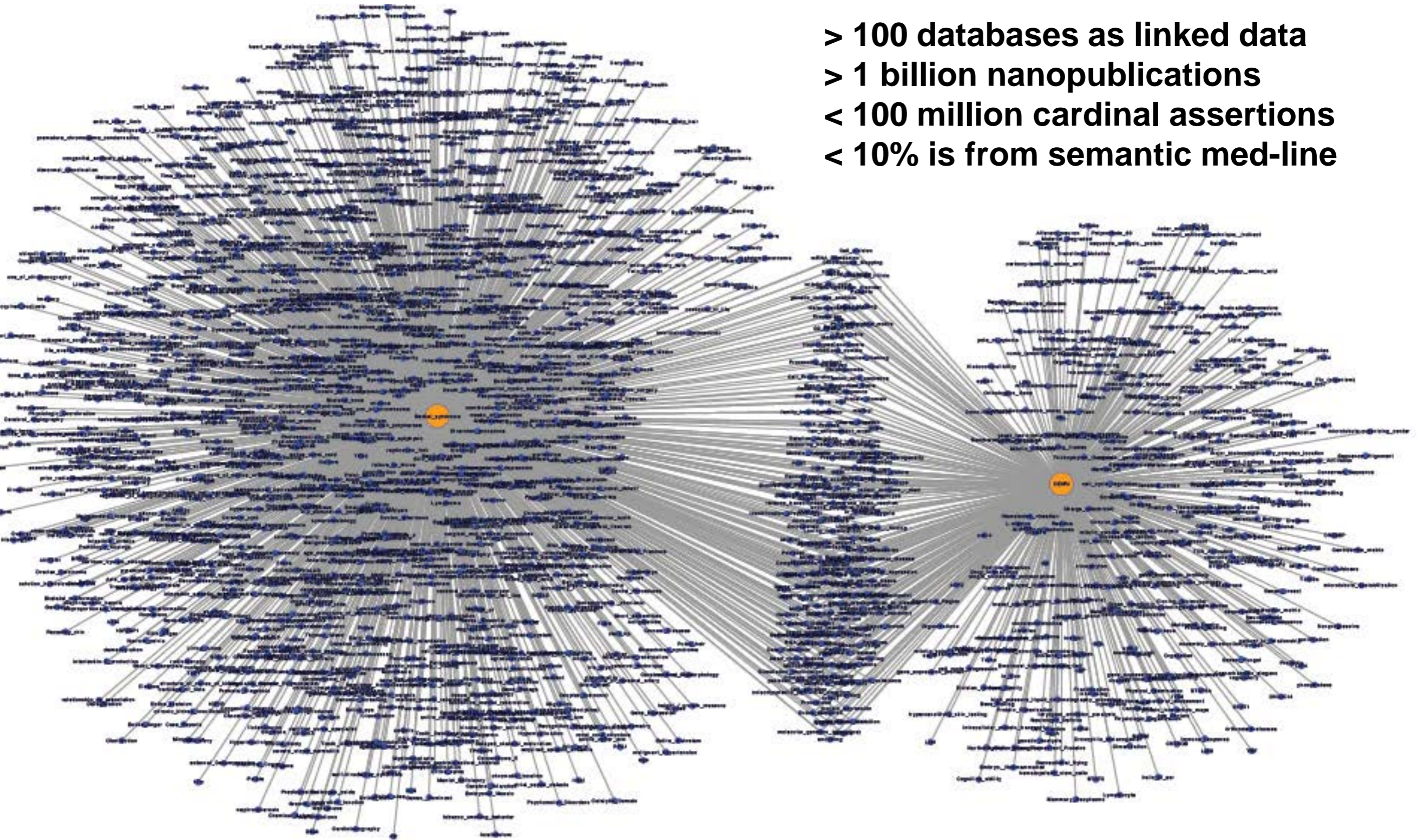


Data Owners



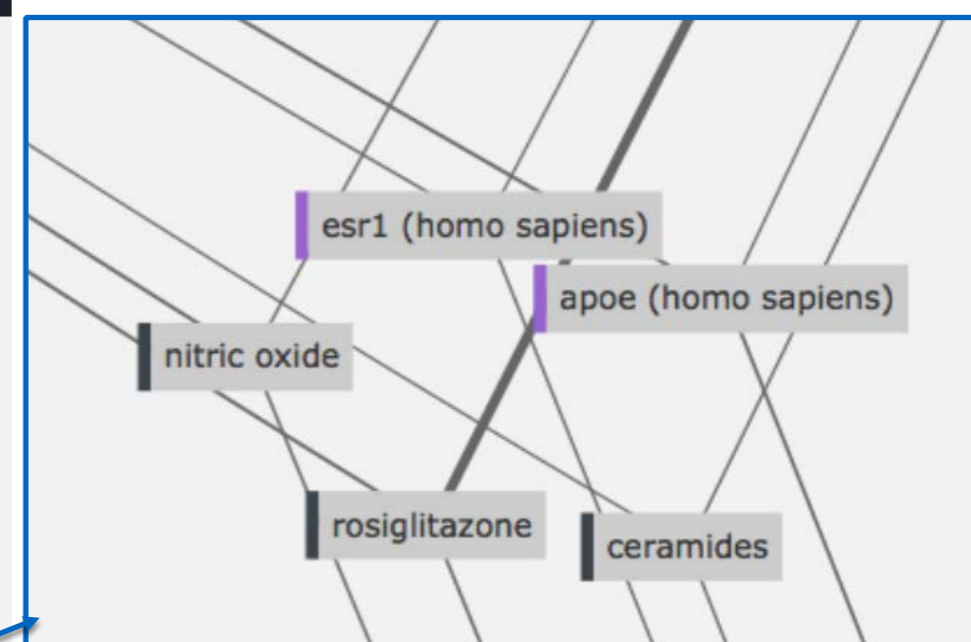
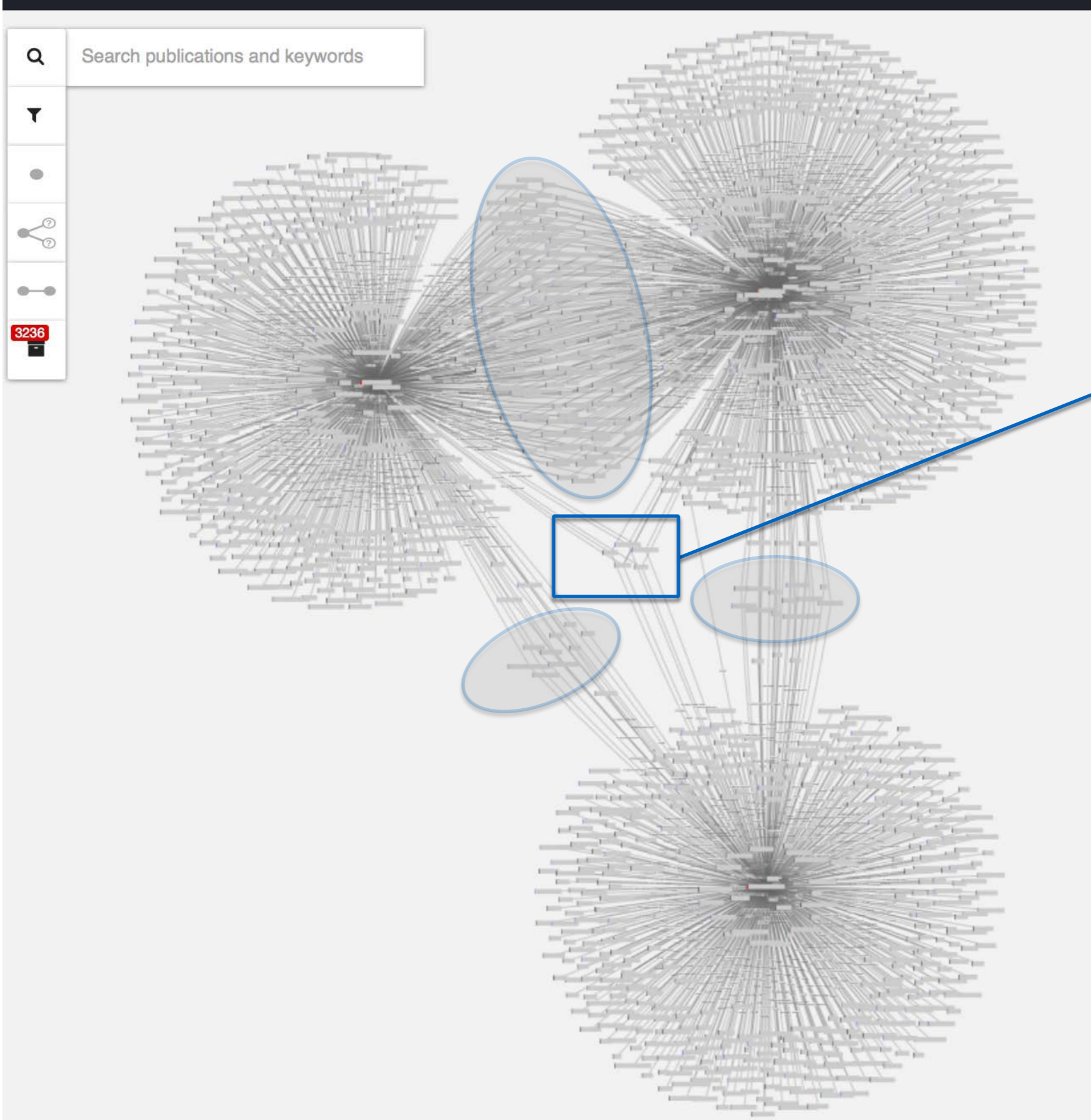
We publish about less than a million LSConcepts !

- > 100 databases as linked data
- > 1 billion nanopublications
- < 100 million cardinal assertions
- < 10% is from semantic med-line



Use case for EMA: Evaluate conceptual links between diseases

Here: Metabolic Syndrome, Diabetes Mellitus II and (early) Alzheimer



[Alzheimer's Disease: APP, Gamma Secretase, APOE, CLU ...](#)
www.hindawi.com/journals/ijad/2011/501862/ - Vertaal deze pagina
door C Carter - 2011 - [Geciteerd door 22](#) - [Verwante artikelen](#)
2 sep. 2011 - While it is recognised that such genes, particularly **APOE**, **ABCA7**, **CR1**, and of the macrophage system to kill the bacteria via **nitric oxide** generation.
Ceramide, a potent activator of apoptosis, as well as its downstream target, able to reactivate the virus, via oestrogen receptor alpha (**ESR1**) [281].
Ontbrekend: rosiglitazone

[\[XLS\] Read Me - Blood Journal](#)
www.bloodjournal.org/highwire/.../TableS3.xlsx - Vertaal deze pagina
10, **APOE**, apolipoprotein E, Extracellular Space, transporter, -2.91844, Protein ... APP, TO-901317, **ABCA1**, **NR1H3**, **NR1H2**, **rosiglitazone**, **Nr1h**, kainic acid, 4-hydroxytamoxifen, **ESR1**, 2-methoxyestradiol, **CD 437**, **CTNNB1**, **EPAS1**, 28, Production of **Nitric Oxide** and Reactive Oxygen Species in Macrophages, 1.77 ...

[Sphingolipids, Insulin Resistance, and Metabolic Disease ...](#)
www.ncbi.nlm.nih.gov > ... > [PubMed Central \(PMC\)](#) - Vertaal deze pagina
door WL Holland - 2008 - [Geciteerd door 254](#) - [Verwante artikelen](#)
1 mei 2008 - Sphingolipids such as **ceramide** and glucosylceramides, while being a ... A. Modulation of sphingolipid levels prevents plaque formation in **ApoE**-deficient mice In fact, the improvement in insulin sensitivity was on par with **rosiglitazone**, one of Endothelial **nitric oxide** synthase (eNOS), which regulates ...
Ontbrekend: esr1

[Acute exercise activates AMPK and eNOS in the mouse aorta](#)
www.ncbi.nlm.nih.gov > ... > [PubMed Central \(PMC\)](#) - Vertaal deze pagina
door JM Cacicedo - 2011 - [Geciteerd door 33](#) - [Verwante artikelen](#)
1 jul. 2011 - Endothelial **nitric oxide** synthase (eNOS) phosphorylation sites, other than For example, in ECs **rosiglitazone** increases NO production (5) and prevents ... of potentially toxic metabolites, such as diacylglycerol and **ceramides** (22). in eNOS^{-/-} **ApoE**^{-/-} mice are ameliorated by enalapril treatment.
Ontbrekend: esr1

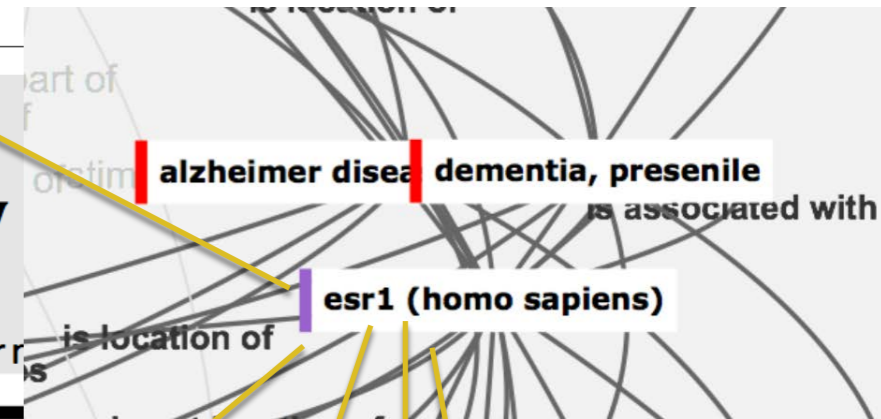


ELSEVIER

Contents lists available at ScienceDirect

Frontiers in Neuroendocrinology

journal homepage: www.elsevier.com/locate/yfrn



Review

Estrogen: A master regulator of bioenergetic systems in the brain and body

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^a Neuroscience Department, University of Southern California, Los Angeles, CA 90033, United States

^b Department of Pharmacology and Pharmaceutical Sciences, School of Pharmacy, University of Southern California, Los Angeles, CA 90033, United States

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ARTICLE INFO

Article history:

Available online 29 August 2013

Keywords:

Adipokine
Adipose tissue
Aging
Alzheimer's disease
Biomarker
Insulin
Menopause
Metabolism
Mitochondria
Type 2 diabetes

ABSTRACT

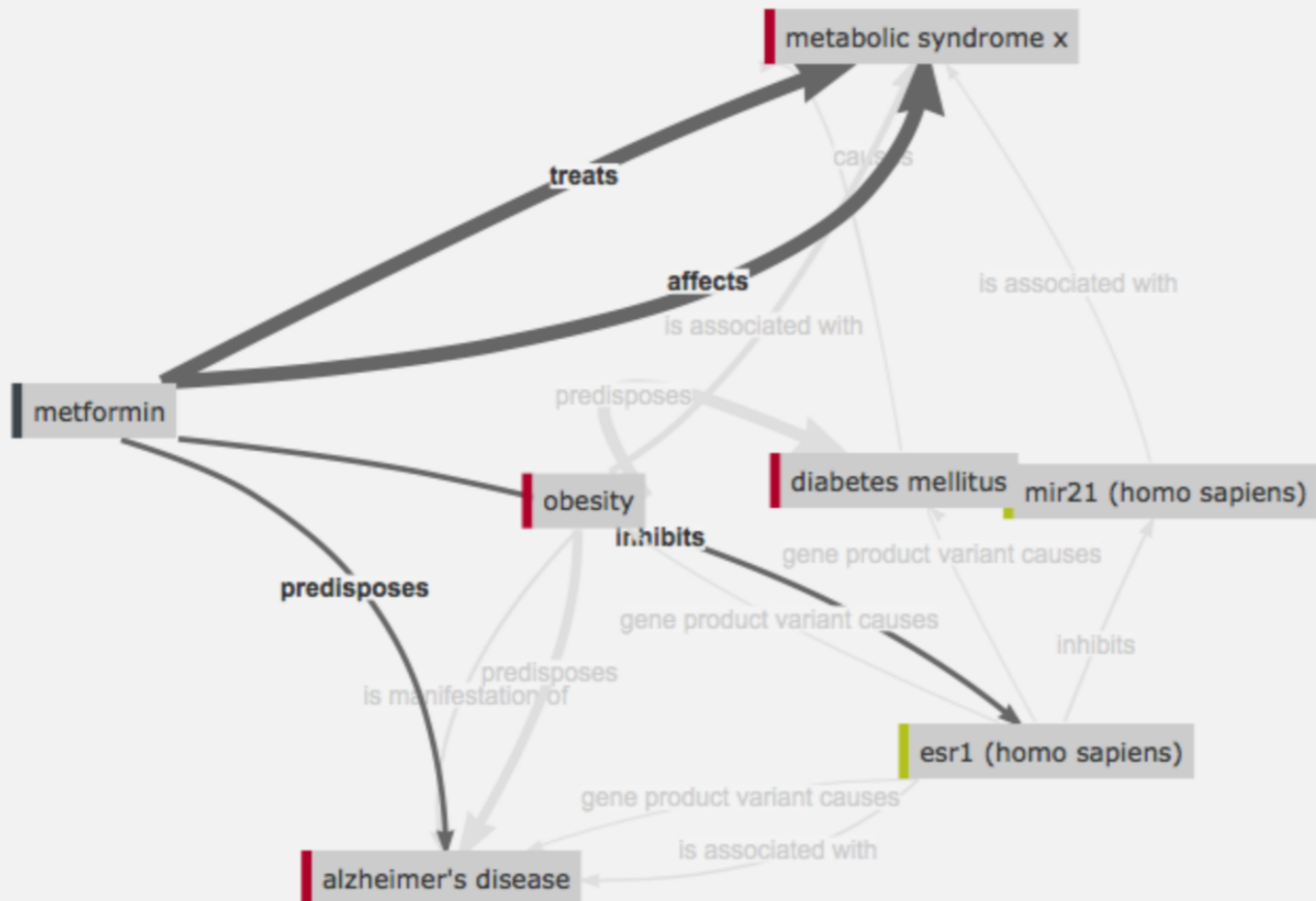
Estrogen is a fundamental regulator of the metabolic system of the female brain and body. Within the brain, estrogen regulates glucose transport, aerobic glycolysis, and mitochondrial function to generate ATP. In the body, estrogen protects against adiposity, insulin resistance, and type II diabetes, and regulates energy intake and expenditure. During menopause, decline in circulating estrogen is coincident with decline in brain bioenergetics and shift towards a metabolically compromised phenotype. Compensatory bioenergetic adaptations, or lack thereof, to estrogen loss could determine risk of late-onset Alzheimer's disease. Estrogen coordinates brain and body metabolism, such that peripheral metabolic state can indicate bioenergetic status of the brain. By generating biomarker profiles that encompass peripheral metabolic changes occurring with menopause, individual risk profiles for decreased brain bioenergetics and cognitive decline can be created. Biomarker profiles could identify women at risk while also serving as indicators of efficacy of hormone therapy or other preventative interventions.

Made during Nir's talk

< esr1 Applications >

? v barendmons@gmail.com

Find a concept to put on the mindmap



MAP DETAILS

Keywords 0 / 1
Relations 4 / 15



4 relations

metformin **INHIBITS** esr1 (homo sapiens)

PUBLICATIONS

[Chemical-Gene Relations /D008687](#)
Source: Comparative Toxicogenomics Database
Publication date: 31-05-2016

[Chemical-Gene Relations /D013739](#)
Source: Comparative Toxicogenomics Database
Publication date: 31-05-2016

[Metformin Attenuates Testosterone-Induced Prostatic Hyperplasia In Rats: A Pharmacological Perspective.](#)
Source: Scientific reports
Publication date: 30-09-2015

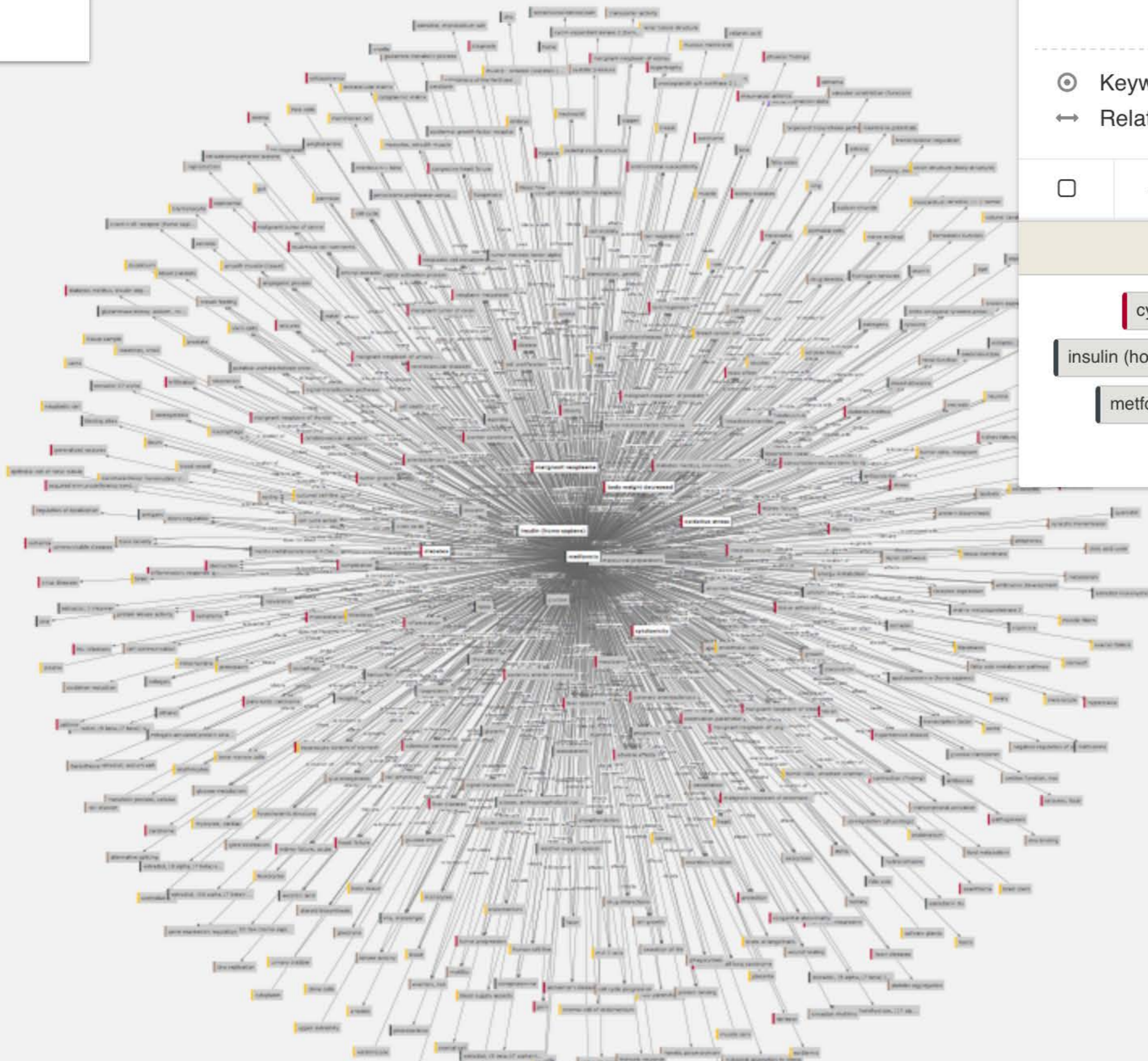
metformin **TREATS** metabolic syndrome x

metformin **PREDISPOSES** alzheimer's disease

PUBLICATIONS

[Metformin, Other Antidiabetic Drugs, And Risk Of Alzheimer's Disease: A Population-Based Case-Control Study.](#)
Source: Journal of the American Geriatrics Society
Publication date: 30-04-2012

ap



MAP DETAILS

🎯 Keywords 7 / 402
↔ Relations 0 / 1112

□ 👁️ ⏸️ ⓘ 📄 🗑️

7 keywords

- cytotoxicity ⓘ
- oxidative stress ⓘ
- insulin (homo sapiens) ⓘ
- malignant neoplasms ⓘ
- metformin ⓘ
- body weight decreased ⓘ
- diabetes ⓘ

🔍
🔍

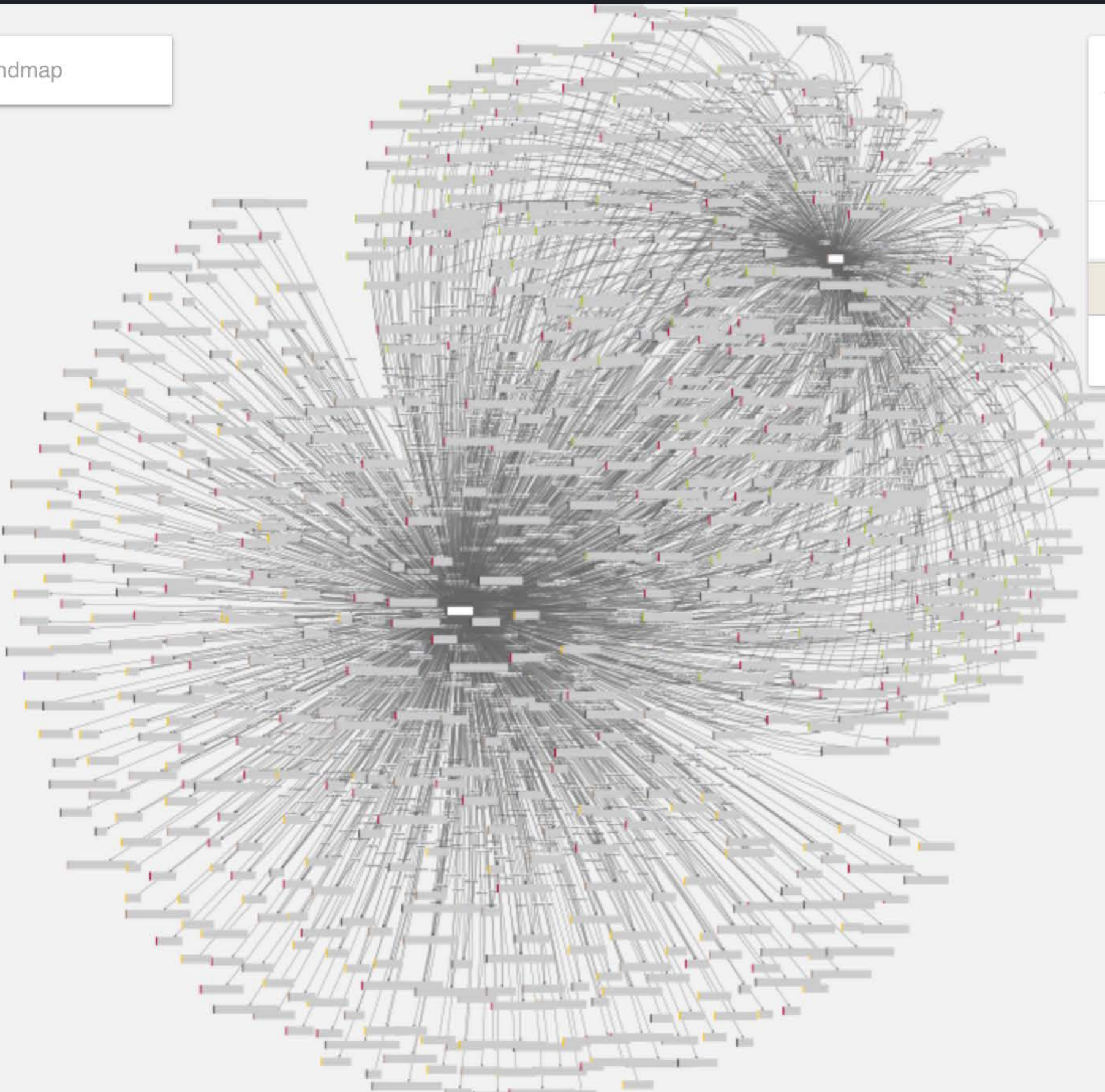


Made after Nir left

< metformin Applications >

? v barendmons@gmail.com

mindmap



MAP DETAILS

🎯	Keywords	2 / 656
↔	Relations	0 / 2287

□ 👁 ▶ ⓘ 📄 🗑

2 keywords

aging ⓘ metformin ⓘ

⌕

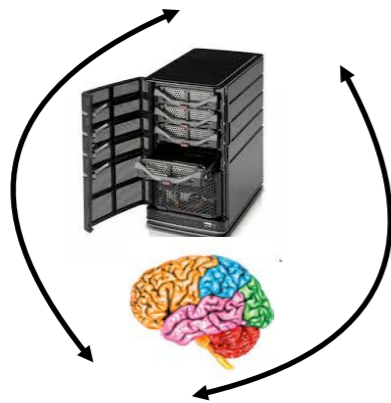
⌕

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What FAIR is NOT

- FAIR is not a standard
- FAIR is not equal to RDF, Linked Data, or Semantic Web
- FAIR is not assuming that (just) humans can find and re-use data
- FAIR is not equal to Open
- FAIR is not a Life Sciences hobby

Data and Services that are not FAIR pretty **'Re-useless'**.....



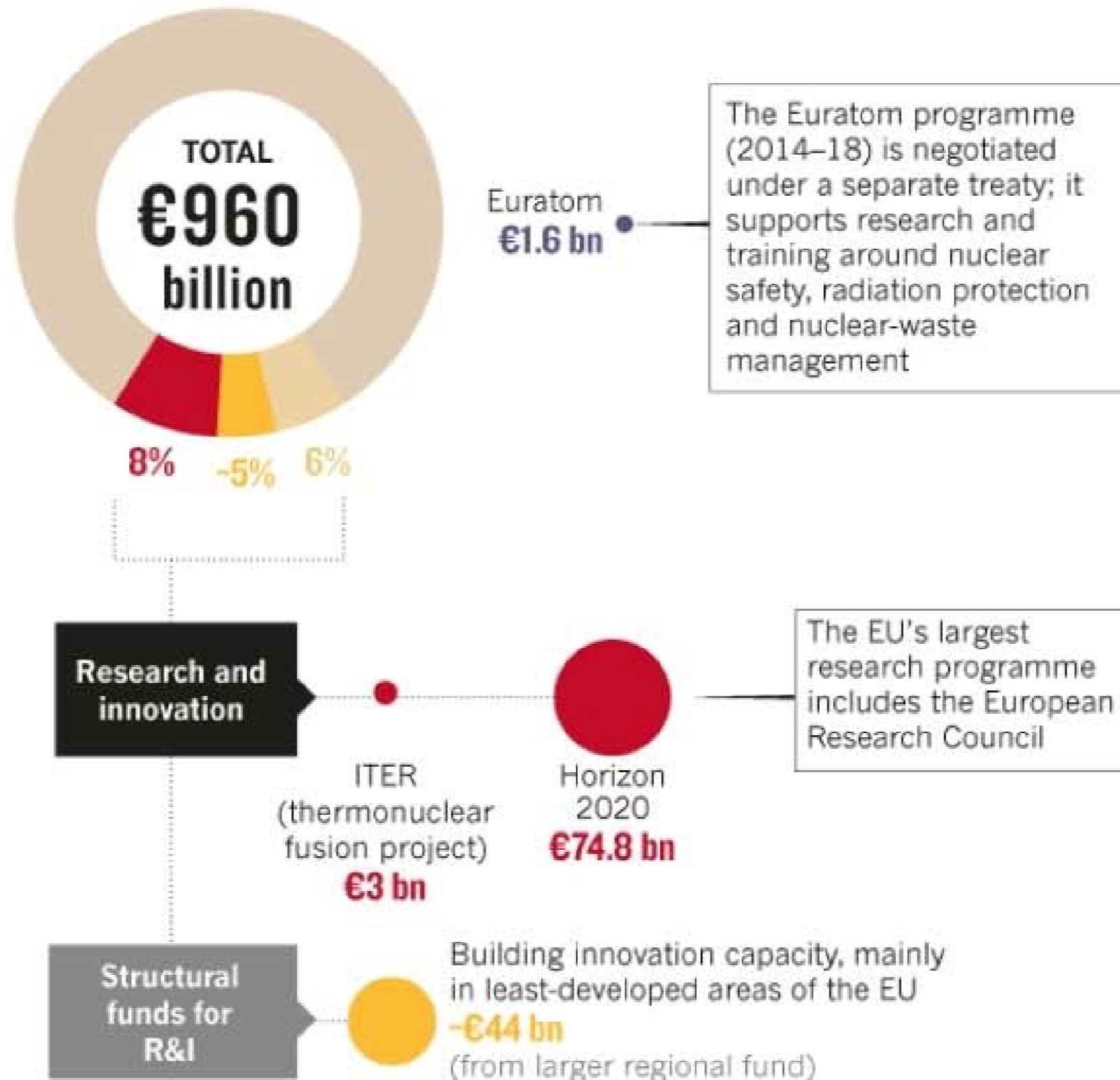
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First report and recommendations
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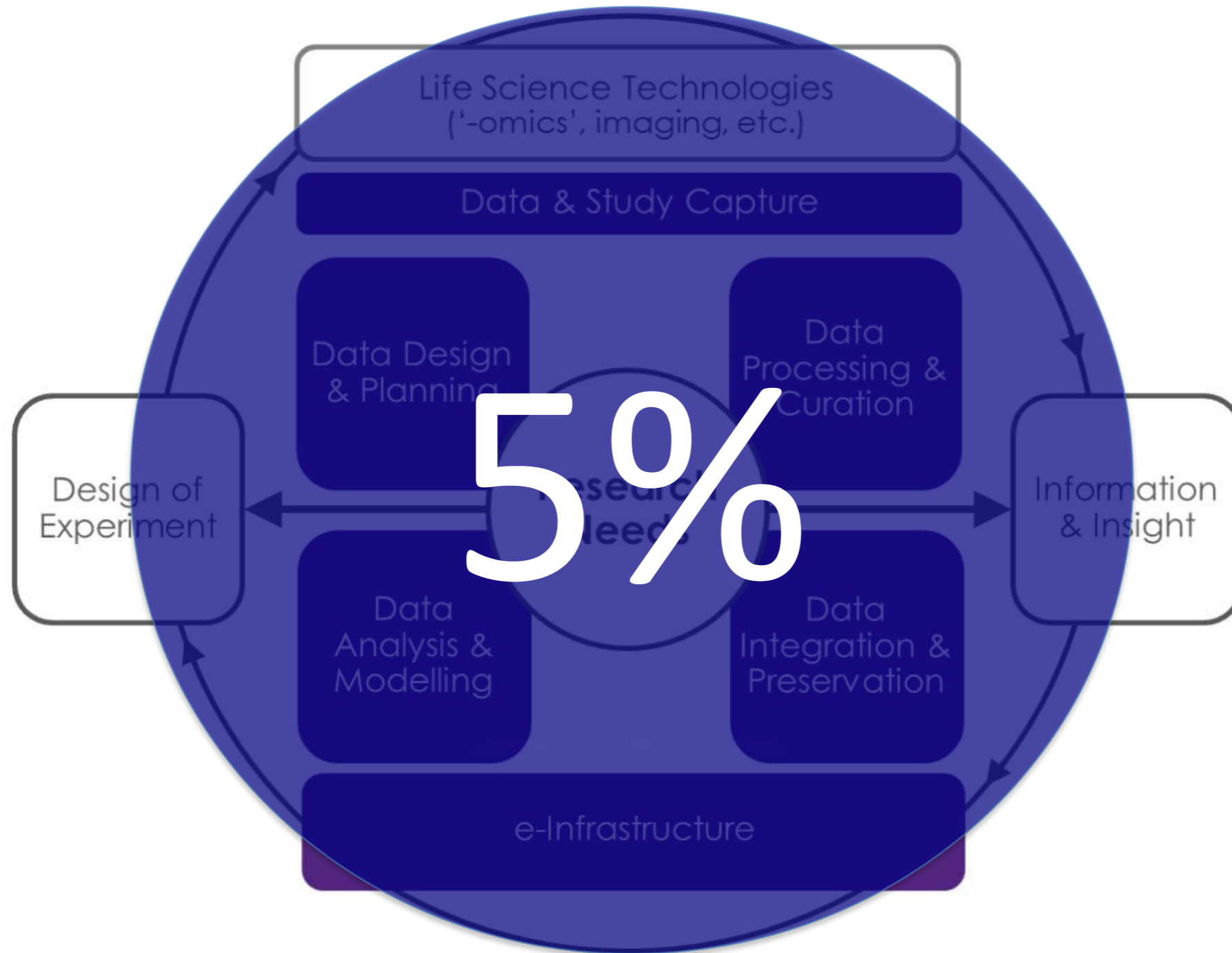
<http://ec.europa.eu/research/openscience/index.cfm?pg=open-science-cloud>

EU SPENDING : 2 B (kick start phase)

The European Union has dedicated more than €120 billion (almost 13%) of its 2014–20 budget to research and innovation (R&I). A host of other EU-funded programmes also support or are connected to R&I activities, but don't define the amount of their investment.



The Data Stewardship Cycle





The Future of FAIR Data Stewardship



OPEN RESEARCH DATA
IN HORIZON 2020

RESEARCH DATA - OPEN BY DEFAULT



HORIZON 2020 GRANTEES ARE REQUIRED

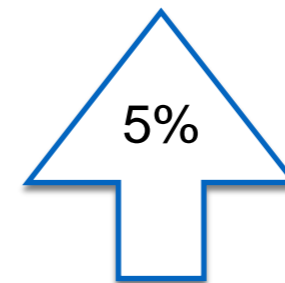
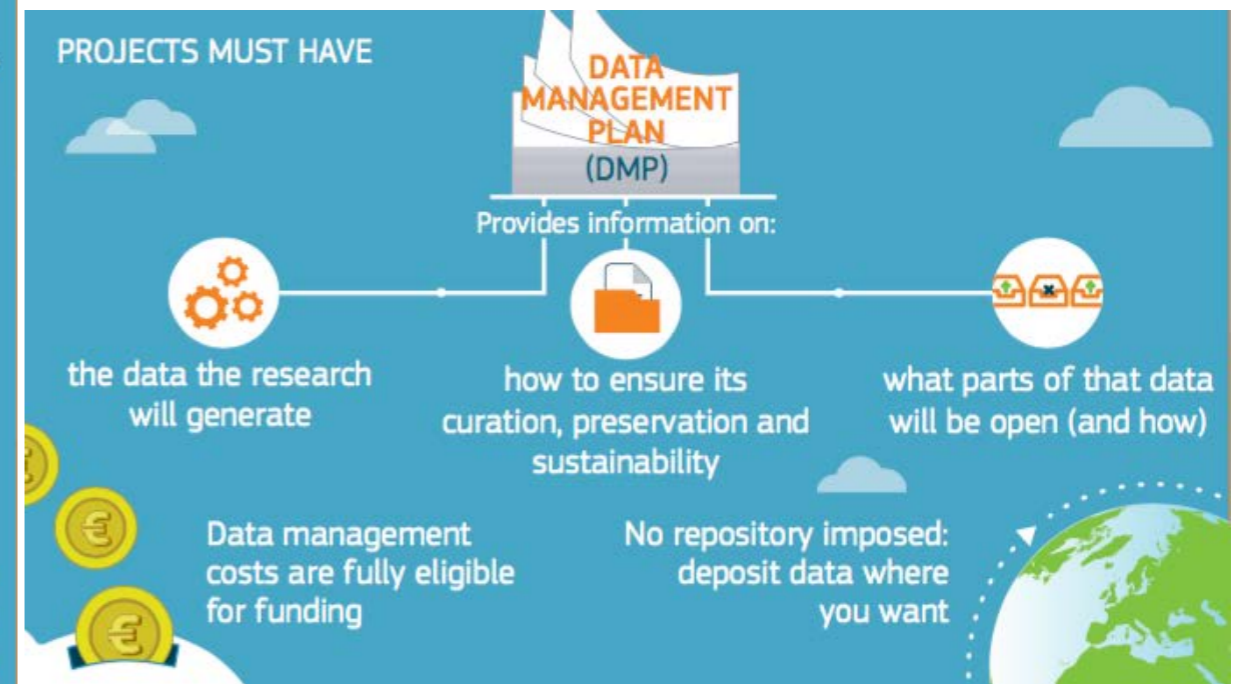
take measures to ensure open access to the data underlying their scientific publications

provide open access to any other research data of their choice

Horizon 2020 grantees are encouraged to also share datasets beyond publication

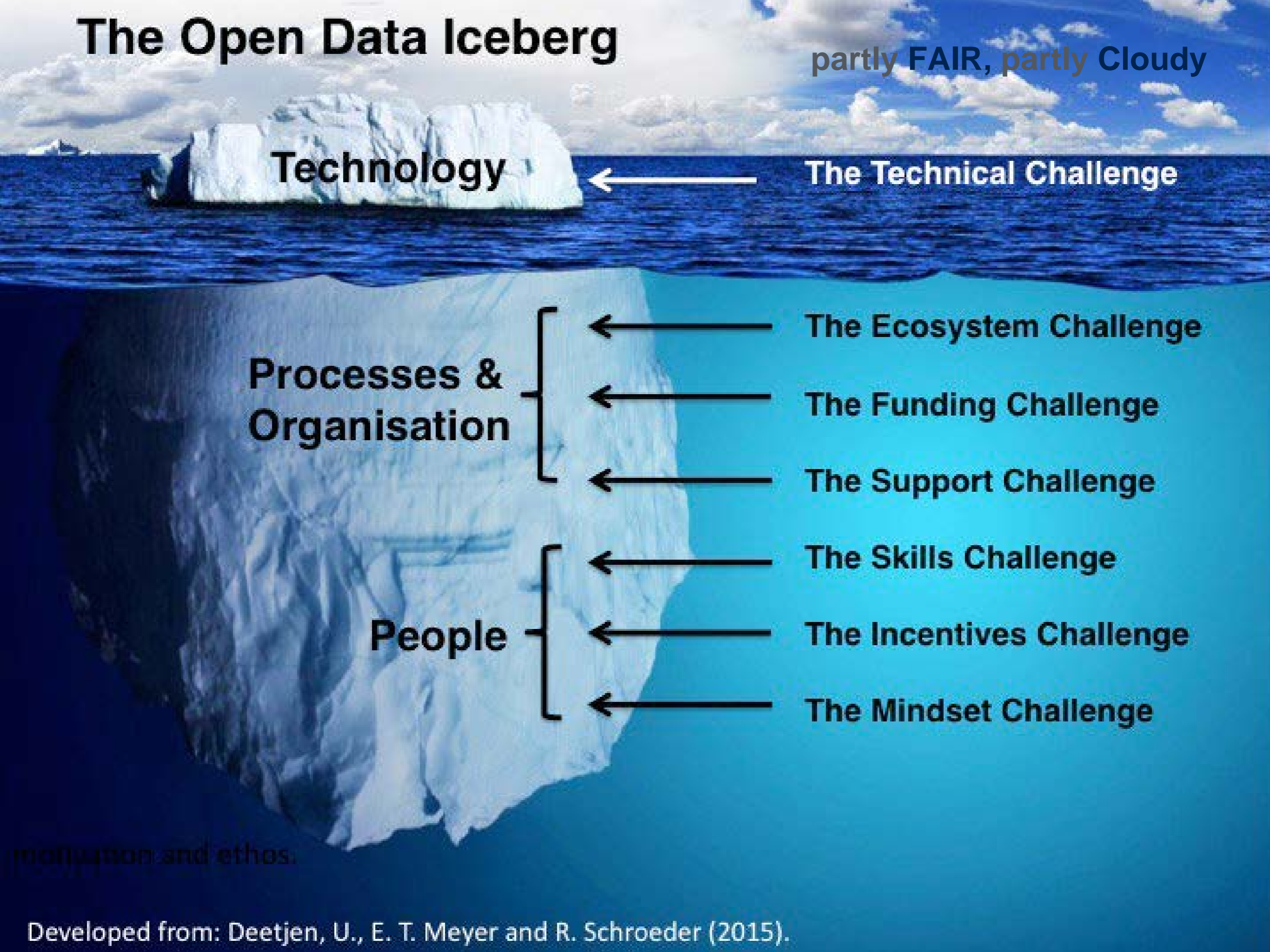


PROJECTS MUST HAVE



The Open Data Iceberg

partly FAIR, partly Cloudy



Technology

The Technical Challenge

**Processes &
Organisation**

The Ecosystem Challenge

The Funding Challenge

The Support Challenge

People

The Skills Challenge

The Incentives Challenge

The Mindset Challenge

motivation and ethos.



RESEARCH & INNOVATION

Open Science Cloud

EOSC: **Supports**

- **Open Science**
- **Open Innovation**
- **Systematic and professional data management**
- **Long term data stewardship**



RESEARCH & INNOVATION

Open Science



European Council
Council of the European Union

Open Science Conference

Open Access



FAIR data

G20 HANGZHOU SUMMIT

HANGZHOU, CHINA 4-5 SEPTEMBER

'We support appropriate efforts to promote open science and facilitate appropriate access to publicly funded research results on findable, accessible, interoperable and reusable (FAIR)'



