



INTERNET OF FAIR DATA AND SERVICES

THE URGENCY OF AFRICA – EUROPE COLLABORATION

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FAIR Data Science, Leiden Global
31 October 2022



LEIDEN UNIVERSITY
MEDICAL CENTER



Universiteit Leiden

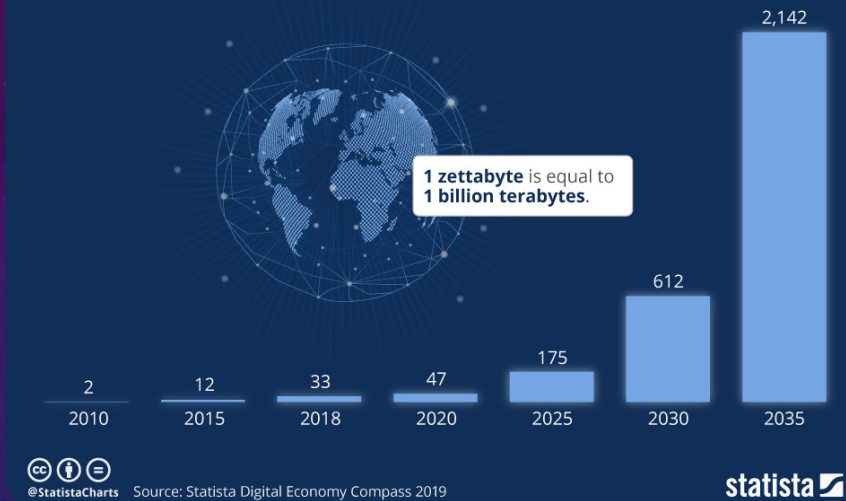
DATA IS THE NEW OIL

The market of data-centric companies has exploded

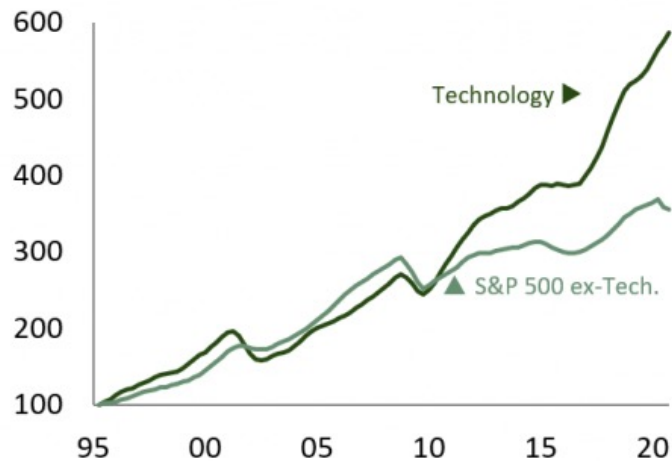
4 of the 5 largest companies globally see the majority of their revenue from data-oriented services

Global Data Creation is About to Explode

Actual and forecast amount of data created worldwide 2010-2035 (in zettabytes)



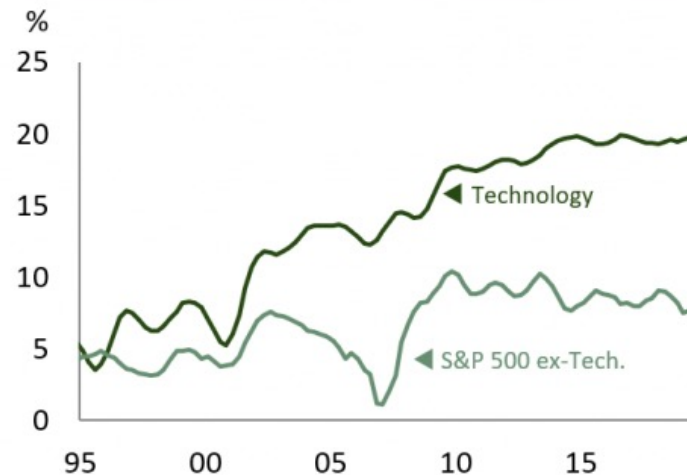
The tech sector has seen meaningfully better growth....



Source: Standard & Poor's, FactSet, Credit Suisse

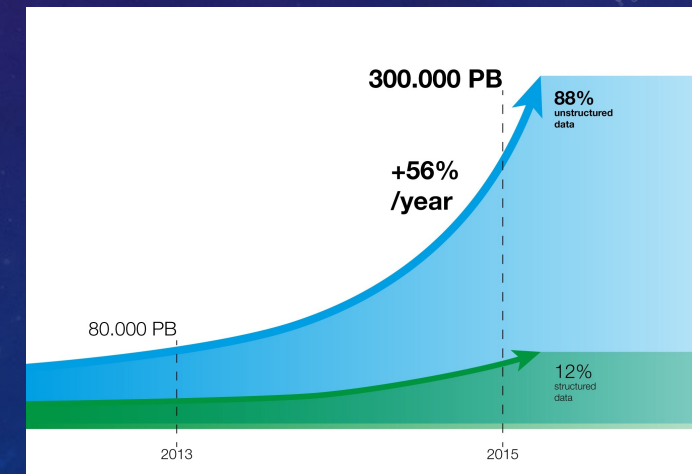
Note: 4-Quarter Moving Average; Revenue growth indexed to 100.

...and generates twice much in terms of FCF margins



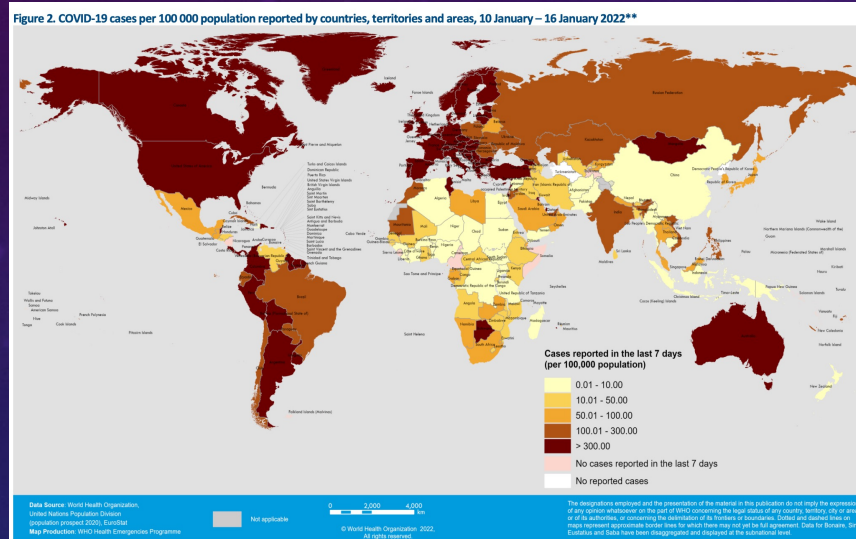
Source: Standard & Poor's, FactSet, Credit Suisse

Note: Trailing 12-months; FCF as a % of Sales – TECH+ vs. S&P 500 ex-TECH+



Data creation has exploded, but the majority of data is unstructured

UNEQUAL GLOBAL PARTICIPATION IN THE DIGITAL DATA ECONOMY

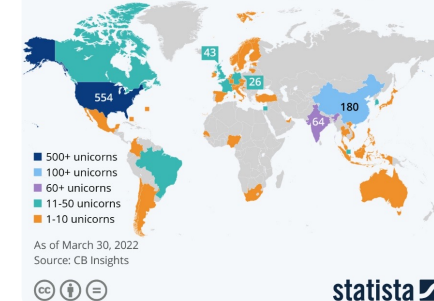


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Global Unicorn Herd Now Counts 1,000+ Companies

Number of privately held, up-and-coming companies with a valuation of \$1 billion or more, per country

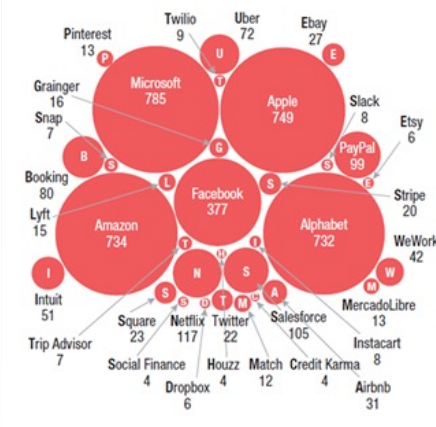


THE WORLD'S TOP 10 MOST VALUABLE BRANDS 2022

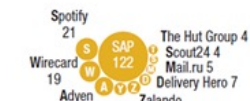
Apple 1 \$355.1bn	SAMSUNG 6 \$107.3bn
amazon 2 \$350.3bn	facebook 7 \$101.2bn
Google 3 \$263.4bn	ICBC 8 \$75.1bn
Microsoft 4 \$184.2bn	HUAWEI 9 \$71.2bn
Walmart 5 \$111.9bn	verizon 10 \$69.6bn

Source: Brand Finance Global 500 2022

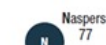
AMERICA



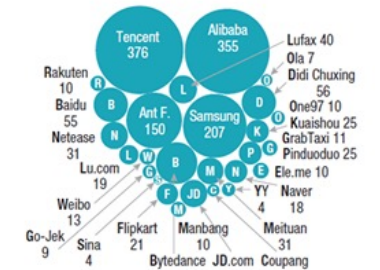
EUROPE



AFRICA



ASIA



Share in total



EUROPE LEADING IN SOFT REGULATION

- General Data Protection Regulation (GDPR, 2018)
- Data curation as **FAIR (Horizon, 2020)**
 - Findable
 - Accessible (under well-defined conditions and GDPR compliant)
 - Interoperable
 - Reusable



Eight policy priorities

Use and management of research results

- 1. FAIR data:** FAIR data sharing is the default for funding scientific research
- 2. European Open Science Cloud:** all EU researchers are able to deposit, access and analyse European scientific data through EOSC, without leaving their desk
- 3. Indicators:** alternative metrics (next generation metrics) complement conventional indicators for research quality and impact (e.g. JIF and citations)
- 4. Future of scholarly communication:** all peer reviewed scientific publications are freely accessible and early sharing of different kinds of research outputs is encouraged

Alignment of research partners

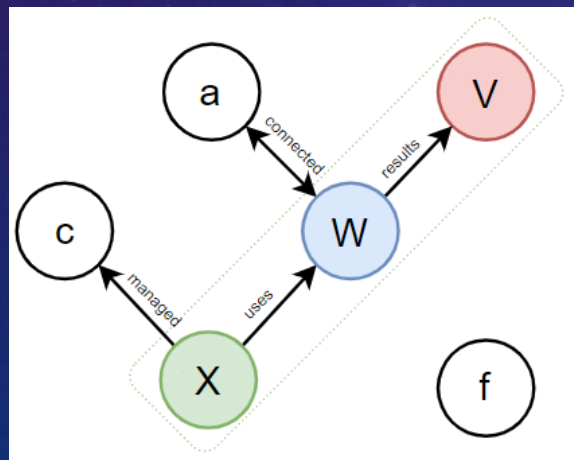
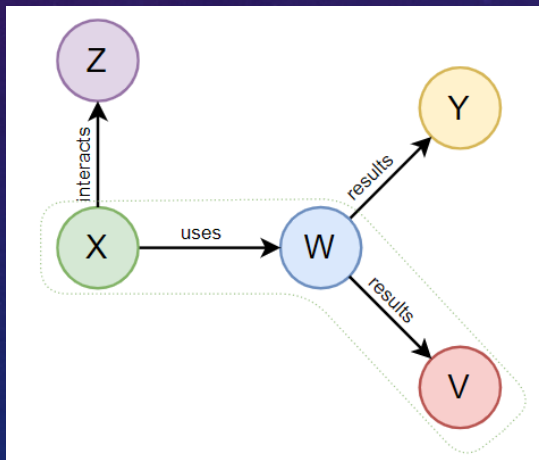
- 5. Rewards and incentives:** the European research career evaluation system fully acknowledges Open Science activities
- 6. Research Integrity:** all publicly funded research in the EU adheres to commonly agreed Open Science standards of research integrity
- 7. Skills and education:** all scientists in Europe have the necessary skills and support to apply Open Science research routines and practices
- 8. Citizen Science:** citizens significantly contribute and are recognised as valid knowledge producers of science

[Pointer](#): Amsterdam Call for Action



THE FAIR FRAMEWORK

- The primary purpose of FAIR is to enable data reuse
 - This is implemented through standardizing data querying, access and formatting with freedom to operate in data-stewardship and re-use
 - The primary vehicle to sustainable, cost-saving scientific research practices
 - Data is structured with knowledge graphs (metadata) which are machine-readable and AI/ML ready



FAIR is central to the **digital transformation** of science, innovation and services

FAIR-OLR creates an ethical, quality data pipeline for reuse in science innovation and services, which is GDPR compliant and respects:

- ✓ **Ownership** of the data
- ✓ **Local provenance** of the data
- ✓ **Regulatory frameworks** in locale, and GDPR

INTERNET OF FAIR-DATA AND SERVICES

There is a need for Fostering FAIR Data Practices in Africa:

- ❑ To connect African Science
- ❑ To strengthen African Science based **innovation and economic participation**
- ❑ To build on **African youth population and labour market potential** to serve the **African and European data economy**



AVAILABLE AUN-INFRASTRUCTURE:

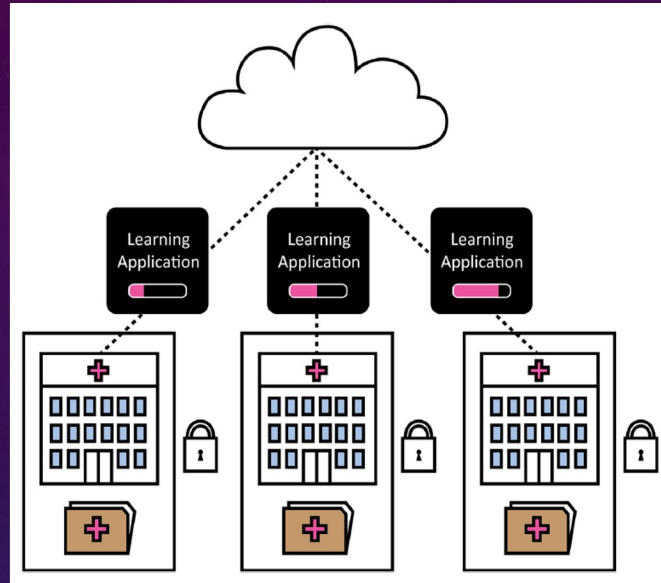
- [African University Network for FAIR Open Science \(AUN\)](#) – demonstrating interest of African universities
 - to embrace FAIR Data Science
- [Virus Outbreak Data Network – Africa \(VODAN-A\)](#) – demonstrating the African capacity
 - to develop and use FAIR-Data for health services to improve quality health at point of care
 - strengthen the availability of digital health data from Africa
 - Strengthen data ownership in localised data repositories that can be queried and computed through data-visiting techniques for interoperability and re-use
- [Digital Innovation and Skills Hub \(DISH\)](#) – demonstrating the involvement of youth in
 - On-line hybrid platform to learn FAIR-data stewardship skills
- [Research platform on Globalisation, Accessibility, Innovation and Care \(GAIC\)](#) – demonstrating the potential of
 - Further development and
 - Integration in the Internet of FAIR Data and Services



AFRICAN UNIVERSITY
NETWORK
ON FAIR OPEN SCIENCE

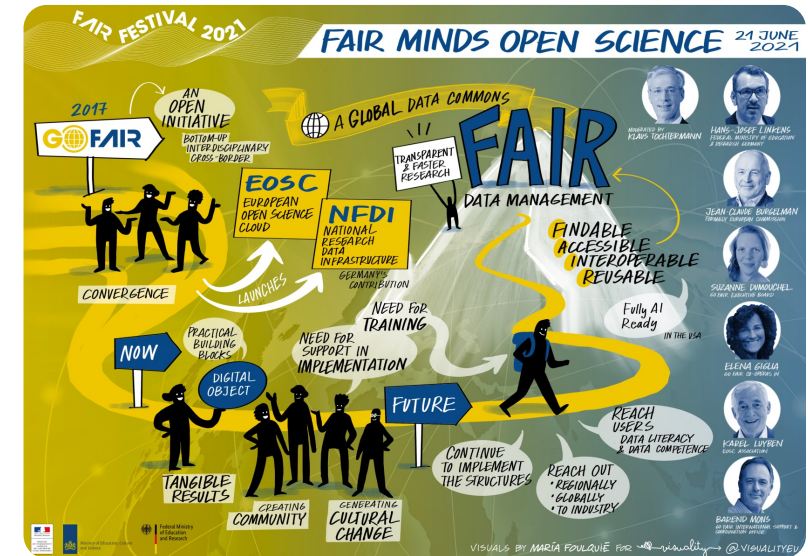


APPLICATIONS



“In the data visiting concept, the questions or analysis algorithms travel to the data. Instead of the data to the analysis. The data visiting solutions speeds up the progress towards earlier diagnosis and new treatments of rare diseases. It avoids double data entry and ambiguity. It standardizes and harmonizes the dataset only once at the source”

(Peter-Bram 't Hoen - Interoperability and FAIRification Work Package Lead)



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Foundation

SUSTAINABLE
DEVELOPMENT
GOALS

9 GOOD HEALTH
AND WELL-BEING

17 PARTNERSHIPS
FOR THE GOALS

KIU
KAMPALA
INTERNATIONAL
UNIVERSITY



In Africa they do it already:
FAIR Ethical Patient Data Records
Deployment in Health Facilities in Africa

VODAN AFRICA

InvestInternational

SDSC SAN DIEGO
SUPERCOMPUTER CENTER

nuffic
nuffic the world

Universiteit
Leiden

GO FAIR

ISH
Digital Innovation and Skills Hub

CEDAR
CENTRE FOR
EVIDENCE-BASED
RESEARCH

Great Zimbabwe University

TILBURG UNIVERSITY
Understanding Society

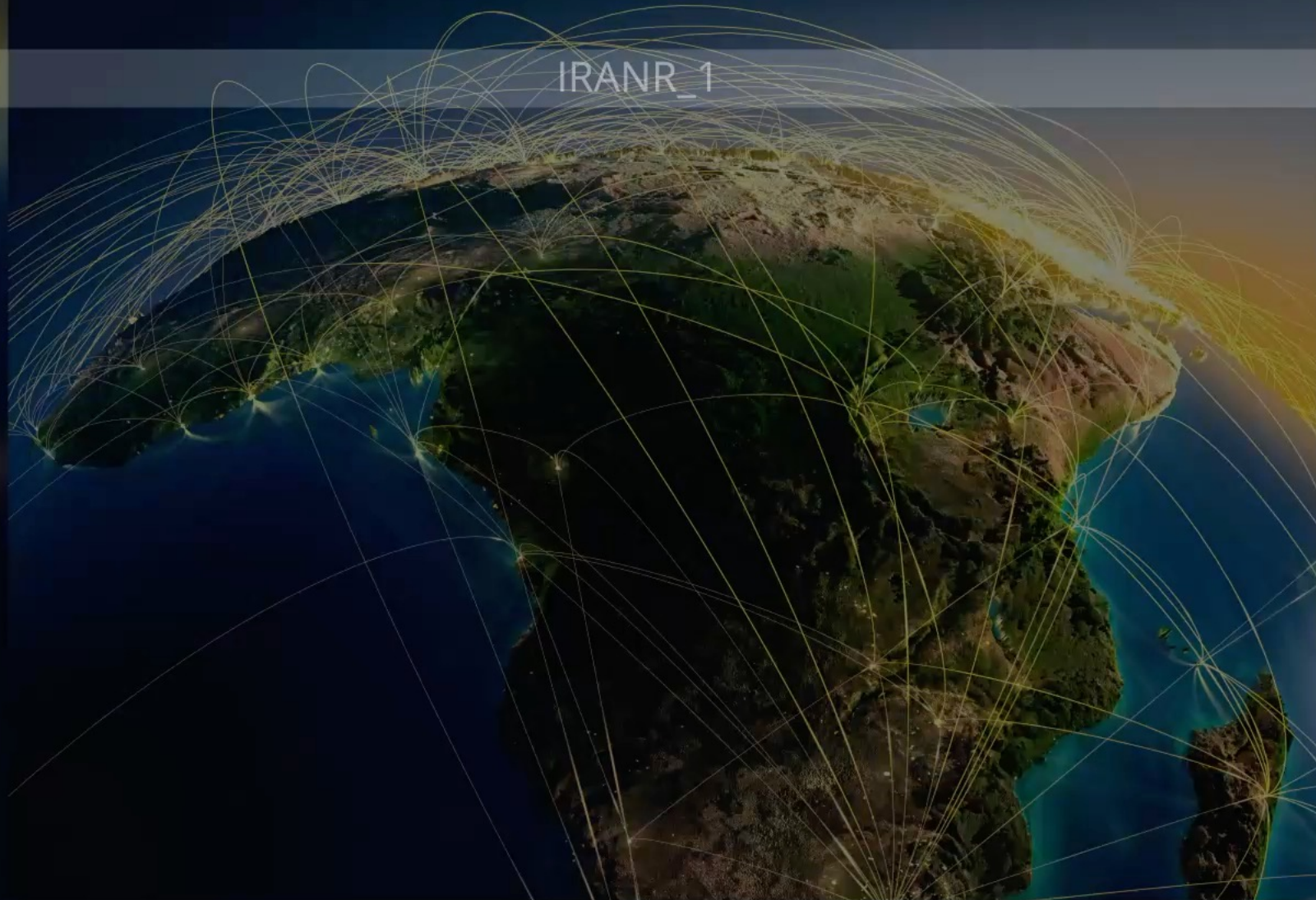
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ADVANCED GENETICS

Open Access

Design of a FAIR Digital Data Health Infrastructure in Africa for COVID-19 Reporting and Research

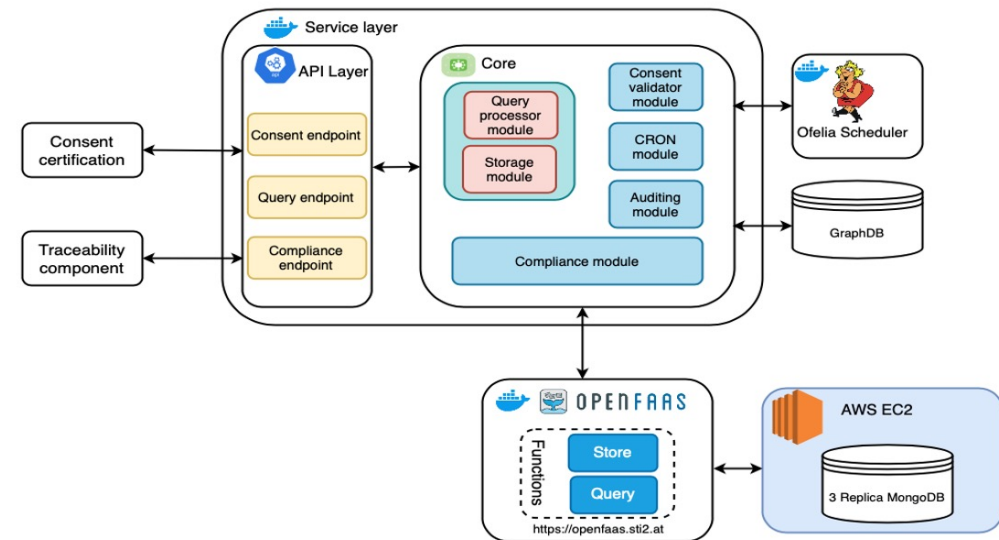
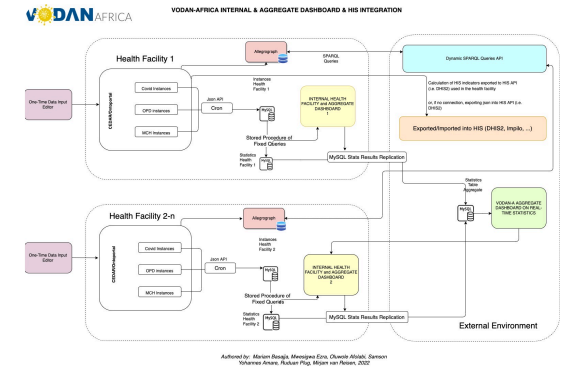
DOI: 10.1002/GGN2.10050



WILEY

AFRICA-EU COLLABORATION

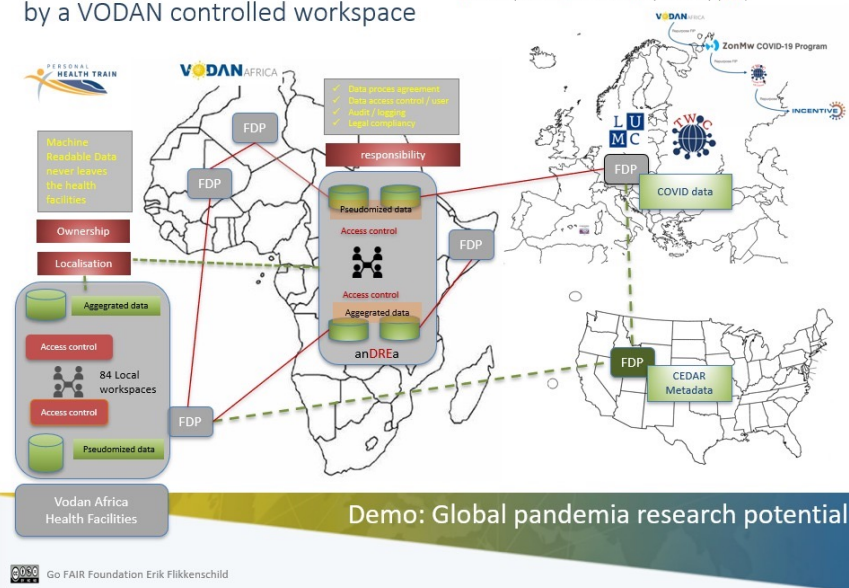
- On FAIR Open Science
- Development of standards
- Training
- Development of (Open Source based) tooling
- Accreditation of certified Data Stewardship Competence Centres
- Integration of African and European Open Science
- Strengthening of data protection and control
- Bussiness development for FAIR Data based services



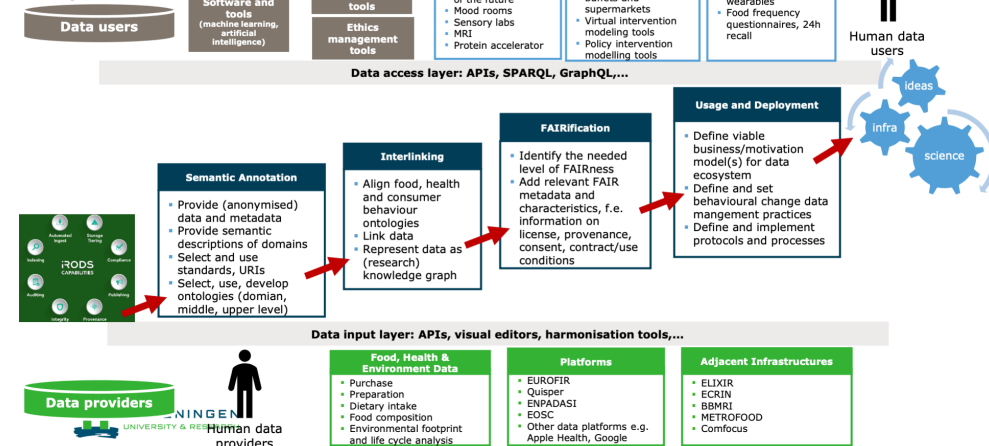
DATA INTEGRATION ACROSS KNOWLEDGE AND SERVICES DOMAINS

FAIR Data Points (FDP) connected:
by a VODAN controlled workspace

Go FAIR Foundation implementation criteria:
Ownership, data Localisation, Responsibility (OLR)



Food & Health Data Infrastructure Architecture – Way to Go





FURTHER LINKS

<https://vodan-totafrika.info/vodan-news-page.php?i=59&a=african-fair-open-data-driven-research-and-services>

[Creating a FAIR Digital Health Information System](https://dish-portal.kiu.ac.ug/2022/06/28/how-dish-is-providing-access-to-digital-technology-skills-and-employment-for-vulnerable-and-affected-communities-in-the-horn-of-africa/)

<https://dish-portal.kiu.ac.ug/2022/06/28/how-dish-is-providing-access-to-digital-technology-skills-and-employment-for-vulnerable-and-affected-communities-in-the-horn-of-africa/>

<https://vodan-totafrika.info/vodan-news-page.php?i=50&a=vodan-africa-team-wins-most-inspiring-presentation-during-the-global-health-symposium-at-leiden-university-medical-centre>

