Bridging challenges and opportunities: ESFRI Roadmap & EOSC Services

Prof. Ana Proykova, FMI, Sofia University
Chair, ESFRI SWG DIGIT

Workshop on Awareness to the Research Infrastructures in Information and Communication Sciences, Paris, May 27, 2019

European Research Area (ERA)

The European approach to research infrastructures has made remarkable progress in recent years with continuously developing and implementing the European Strategy Forum on Research Infrastructures (ESFRI) **roadmap** for infrastructures, integrating and opening national research facilities and developing e-infrastructures underpinning an open digital ERA

The ESFRI roadmap is an ongoing process

2006 (the first one) - 35 projects

2008 (updated) – 44 projects

2010 - the update focusing on projects dealing with energy, food and biology

2016 - update process identified projects that were expected to move to implementation in less than 10 years from their first inclusion on the Roadmap.

Three parts in the 2018 roadmap

Part1: Strategy Report

Part2: Landscape Analysis

Part3: Projects & Landmarks

http://roadmap2018.esfri.eu/

http://roadmap2018.esfri.eu/media/1061/rm2018-annex-20.pdf

ESFRI Roadmap 2018

- 18 ESFRI Projects
- 37 ESFRI Landmarks

- **Evolving role of the RIs:**

to address the **FAIR** –

Findable, **A**ccessible, **I**nteroperable, **R**eusable –

data principles and e-Infrastructure, the Long-Term Sustainability and the benefits for innovation

New ESFRI Projects in the Roadmap 2018 fill gaps in ERA

- The International Fusion Materials Irradiation Facility - DEMO Oriented NEutron Source (**IFMIF-DONES**) (**ENE**)
- The Distributed System of Scientific Collections (**DiSSCo**) (**ENV**)
- The Integrated European Long-Term Ecosystem, critical zone and socio-ecological system Research Infrastructure (**eLTER**) (**ENV**)
- The Industrial Biotechnology Innovation and Synthetic Biology Accelerator (**EU-IBISBA**) (**H&F**)
- The Infrastructure for promoting Metrology in Food and Nutrition (**METROFOOD-RI**) (**H&F**)
- The European Holocaust Research Infrastructure (**EHRI**)

The ESFRI-2018 projects

ENERGY – 4 PROJECTS

EU-SOLARIS European Solar Research Infrastructure for Concentrated Solar Power (distributed) 2010 2020* {**construction 6**; **operation 0.2**} million Euro, M€

IFMIF-DONES International Fusion Materials Irradiation Facility - DEMO Oriented NEutron Source (single-sited) 2018 2029* {**420**; **50**} M€

MYRRHA Multi-purpose hYbrid Research Reactor for High-tech Applications (single-sited) 2010 2027* {**1.352**; 74} M€

WindScanner European WindScanner Facility (distributed) 2010 2021* {6.1; 2} M€

The ESFRI-2018 projects

ENVIRONMENT – 4 PROJECTS

ACTRIS Aerosols, Clouds and Trace gases Research Infrastructure (**distributed**) 2016 2025* {**190; 50**} M€

DANUBIUS-RI International Centre for Advanced Studies on River-Sea Systems (**distributed**) 2016 2022*{**222; 28**} M€

DiSSCo Distributed System of Scientific Collections (**distributed**) 2018 2025* {**69.4; 12.1**} M€

eLTER Integrated European Long-Term Ecosystem, critical zone and socio-ecological system Research Infrastructure (**distributed)** 2018 2026* {**94; 35**} M€

The ESFRI-2018 projects

HEALTH AND FOOD – 6 PROJECTS

AnaEE Infrastructure for Analysis and Experimentation on Ecosystems (**distributed**) ERIC Step1, 2010 2019*{ **1.1; 0.8**} M€

EMPHASIS European Infrastructure for Multi-scale Plant Phenomics and Simulation (**distributed**) 2016 2021* {**73; 3.6**}

EU-IBISBA Industrial Biotechnology Innovation and Synthetic Biology Accelerator **distributed** 2018 2025* {**11; 65.1**} M€

The ESFRI-2018 projects

HEALTH AND FOOD

ISBE Infrastructure for System Biology Europe (distributed) 2010 2019* {10; 5.2} M€

METROFOOD-RI Infrastructure for promoting Metrology in Food and Nutrition (distributed) 2018 2019* {78.8; 31} M€

MIRRI Microbial Resource Research Infrastructure (distributed) 2010 2021* {0.8 0.7} M€

The ESFRI-2018 projects

PSE – 2 PROJECTS

EST European Solar Telescope (**single-sited)** 2016 2029* {200; 12} M€

KM3NeT 2.0 KM3 Neutrino Telescope 2.0 (**distributed)** 2016 2020* {151; 3} M€

SCI – 2 PROJECTS

E-RIHS European Research Infrastructure for Heritage Science (**distributed)** 2016 2025* {20; 5}

EHRI European Holocaust Research Infrastructure (**distributed)** 2018 2022* {0.8; 2} M€

Funding - sustainability

Most of the ESFRI landmarks (37) and projects (18) include substantive and growing support to data stewardship and preservation – while often triggered by EU grants, mostly funded by MS (80%).

RETURN OF INVESTMENTS

Bridging databases – open data initiatives: challenges and opportunities

Courtesy
https://www.ibmbigdatahub.com/

Big data/cloud – two technologies with an enormous impact

Ris Pillars – data to/from the cloud challenges: data collection, storage, analysis

Opportunity:
unlock the value of your data

- Modernize (multi-cloud) – new opportunities like Artificial Intelligence (robots)/blockchain
- Collect (make the data simple and accessible)
- Organize

A modern data architecture (MDA) must support the next generation cognitive enterprise which is characterized by the ability to fully exploit data

WHAT IS DATA ARCHITECTURE

Data Architecture is a set of rules, policies, and models that determine what kind of data gets collected, and how it gets used, processed, and stored within a database system.

Data integration, for example, is dependent on Data Architecture for instructions on the integration process.

Challenge: cloud or clouds

H2020 Opportunities

- **Integrate** and consolidate the e-infrastructure platforms
- Federate existing research infrastructures and scientific clouds
- Support the development of ***cloud-based services for Open Science***

Call Connecting ESFRI infrastructures through Cluster projects

Current ESFRI RIs cluster projects are:

- ENVRI-FAIR - Europe's environmental research infrastructures;
- EOSC-life - creating EOSC for the life sciences;
- ESCAPE - astronomy & particle physics cluster;
- PaNOSC - Photon and Neutron Open Science Cloud;
- SSHOC - Social Sciences and Humanities Open Science Cloud.

Common features of ESFRI RIs cluster projects – towards EOSC

- Research data policies and standards;
- Research data management and stewardship;
- FAIR data sharing and publishing domain data in the EOSC;
- FAIR tools and services, exposed in the EOSC catalogue of services;
- Long-term sustainability of FAIR research data and services;
- Training.

The EOSC Portal

is jointly developed and maintained by

EINFRACENTRAL (731049),

EOSC-hub (777536),

EOSCPILOT (739563),

OpenAIRE-Advance (246686)

projects funded by the European Union's Horizon 2020 research and innovation programme with contribution of the European Commission – horizontal infrastructures

Information and Communication Technology (ICT)

The term *information and communication technology*, refers to how humans communicate using machines and computers, making a **distinction from** *information and computer science*, which is how computers use and gain information.

Communication: technology/science

Science communication is the public communication of science-related topics to non-experts. This often involves professional scientists (called "outreach" or "popularization"), but has also evolved into a professional field in its own right.

Being able to communicate the relevance and impact of their ideas and discoveries can enhance scientists' ability to secure funding or find a job. It allows them to write better and more comprehensible research papers.

The realm of information and communication sciences

Data intensive research infrastructures on the ESFRI roadmap need the emerging EOSC services to be successful in the realm of information and communication sciences of the 21st century. Why?

These services are expected to free some time of the scientists for developing new ideas and outreach that attracts young and talented researchers to the Ris.

Acknowledgement

This work was supported by the project, NIS-3317 "Information and Communication Technologies for a Single Digital Market in Science, Education and Security" of the Scientific Research Center at the Sofia University.

Thank you for your attention!

anap@phys.uni-sofia.bg

ana.proykova@fulbrightmail.org

http://nestum.phys.uni-sofia.bg