Online session "Visions, requirements and needs for Future Research Environments in the Healthcare domain": Synthesis of the takeaway messages

The EOSC initiative aims at supporting more than 1.7 million researchers and boosting interdisciplinary research in Europe. To better understand what the research community needs, the **EOSCSecretariat** partner **TU Wien** is organizing a series of **workshops** and an **exploration series**.

In order to address research communities in a structured way, TU Wien invited experts from the healthcare domain to participate in an online session to inquire about domain-specific visions, requirements and needs for (future) research environments. A **full report** was published on 4 September 2020.

The findings will feed directly into the work of the EOSC Executive Board (EB) and Working Groups (WGs), thus provide input crucial for the development of the EOSC. However, participants of the workshop get the chance to feedback the report until the end of February 2020 before doing so. Preliminary key findings include:

The Discussion on **Reshuffling Research Environments** addressed topics such as education and Data Literacy, support for the whole research cycle, support for highly focused studies, human expert infrastructure services, and enhancing collaboration. Actions required include:

- As research should not be driven by trends and hypes, EOSC services have to address the need of research topics that currently are considered niche
- People need to have basic data literacy skills. Thus, data literacy basics should be anchored in curricula at all levels of education
- EOSC could support the whole research cycle by offering evaluation services to check the quality of data, research output or enable researchers to put results under scrutiny (see also the discussions on *Data* further below)
- AI approaches supplement and reinforce human peer review (e.g. running data, software checks, checking biases…). In addition, machines could help overcome human biases and thus would be better at peer reviewing as algorithms can be inspected and evaluated. In principle, they offer higher transparency
- Big data offers great statistical power. However, big data also comes with higher complexity, which might lead to a higher false discovery rate. Thus, it is crucial to have support in EOSC to conduct highly focused studies
- Establishing support teams for scientific experts as part of a "human expert infrastructure" service would help to speed up scientific processes. Researchers could then contact experts in e.g. statistics, programming, data stewardship and many more, if questions and requirements outside their core domain expertise should arise
- Research collaborations within smaller groups must be facilitated and funded

Topics such as connecting health systems, counteracting data colonialism, civic data cooperatives and avoiding vendor-lock in as well as vendor dominance were discussed in connection with **Facilitating Data Intensive (Health) Systems.** Actions required include:

- Many systems do not have the intelligence to take timely actions to e.g. control or contain a pandemic, or to reconfigure their systems to allow cross-agency communication and support actions across different agencies, which is crucial for public health
- Connecting various health systems with each other is key to understand them better. With regard to connecting such systems, national trusted nodes are a good starting point. National trusted nodes can work on specific topics, align with each other, agree flexibly on e.g. protocols on the technical, legal and trust level, which enables an organic growth of research institutions and health provider networks
- Counteracting data colonialism is a political imperative. Solutions must involve society and be based on trust and mutual aid. There are many ways to gain the citizen's trust:
    - have the data work for the benefits of society and do better with what is there already
    - implement consortia of actions and protocols
    - impede vendor lock-in and vendor dominance
    - establish basic GDPR right to data portability, duties of transparency and cooperation for each participant
    - rely on civic data co-operatives[1]

[1] For further information on civic data co-operatives, please see Buchan, Iain. 2020: The Health of the Nation. A strategy for Healthier Longer Lives. https://documentcloud.adobe.com/link/track?uri=urn%3Aaaid%3Ascds%3AUS%3Aa0271ed8-f813-4bb3-a0e4-342ab024e58f#pageNum=1

EOSCsecretariat.eu has received funding from the European Union's Horizon Programme call H2020-INFRAEOSC-2018-4, grant Agreement number 831644

- Citizens need to act as their own hub and as a trusted third party to optimize data uses and to increase societal benefits from the use of data. Such civic data cooperatives are about developing a culture that thinks as a group or as a system as well as about enabling a cooperative way of working between different players.

Discussions surrounding **Data** covered two topics: the trustworthiness of data as well as reproducibility in research. Actions required include:

- The trustworthiness of data has to be ensured by all means. Thus, there needs to be a transparent framework to understand the data (depending on the type of data). Services to help with checking and verifying data quality need to be offered. Such services include[2]
  - Services to enable the automatic recording of provenance metadata for data, computation, and processes
  - Services for data capturing
  - Services to track provenance
  - Services for secured and monitored data visiting
  - Services for validation processes
- The reproducibility of research is still an issue. EOSC needs to support robust research by providing access to primary data (as it is crucial in reproducing results) and mechanisms to support reproducibility studies

Focusing on **Interdisciplinary Research** led to the discussion of themes such as translation services and knowledge brokering. Actions required include:

- Interdisciplinary research needs to be supported by translation services to help communication across disciplines. Key terms, scientific concepts and research outputs need to be communicated to policy makers and to the public efficiently[3]
- Opportunities for research need to be translated into tangible benefits for society. Thus, services facilitating two-way or multiway exchange of information are key. Knowledge needs to be brought together to create knowledge infrastructures and to bridge gaps between knowledge producers and knowledge consumers
- Reliable knowledge infrastructures can support researchers to coordinate research efforts so that they can look at different aspects of one problem
- Knowledge brokering also matters, because it helps with the distribution of knowledge to different audiences. Thus, it also serves public outreach and research promotion

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The online session was organized by TUWien representatives of EOSCSecretariat Andreas Rauber (PI) and Katharina Flicker

[2] Detailed descriptions of these services cannot only be found in the report on the workshop focusing on visions, requirements and needs in the healthcare domain (DOI:10.5281/zenodo.4015121) but also in the *Report on the workshop "Co-creating the EOSC: Needs and requirements for future research environments* (DOI:10.5281/zenodo.3701194).

[3] See footnote above

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