

Knowledge Sharing in Public-Private Partnerships in Life Science: An Open Science Perspective

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Motivation and context

- PhD research project on **scientific knowledge sharing in PPPs conducting OI**
 - *“Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively”*
 - Source: Henry Chesbrough, Open Innovation: Researching a New Paradigm (2006)
- Analyze and model knowledge **ownership and sharing** in such PPPs
- Explore **relationships between OI and OS** paradigms and practices
 - Does OI condition the access to scientific knowledge or prevent the implementation of OS practices?
 - May OS contribute to OI?

Methodology

- Focus on PPPs funded under EC's Framework Programme
 - Analysis on EC's related documentation
 - Policies, position papers, research agendas, work programs...
 - Semi-structured interviews with senior researchers
 - Involved in PPPs funded under EC's Framework Programme (FP6-FP7-H2020)
 - In the field of Life Sciences
 - *Ongoing work*

1. What does EC say? (1)

- **Inputs**

- ...
- Independent Expert Group on Knowledge Transfer and Open Innovation (2012)
- High Level Expert Group European on Open Science Cloud (2015)
- High Level Advisory Group on Open Science Policy Platform (2016)

- **Outputs**

- European Open Science Agenda (draft)
- Book “Open innovation, open science, open to the world: A vision for Europe” edited by EC, June 2016

1. What does EC say? (2)

- OI must help to connect and exploit OS results
 - OS per se does not ensure commercialization of scientific knowledge and results
- Market-oriented knowledge creation and circulation
 - Research skills, science, funding, IPR... as a matter of supply and demand
 - Scientific work must correspond to the needs of users
 - Knowledge must be findable, accesible, interpretable and re-usable (FAIR)
- “OS does not mean free science”
 - IPR protection prior to making knowledge publicly available
- OS mainly understood in terms of Open Access and Open Data

2. What do researchers say?

- a. What is the level of **knowledge** of OS policies and practices among researchers?

- b. Which **barriers and incentives** to scientific knowledge sharing and to the adoption of OS practices could be identified in PPPs?

2a. OS knowledge

- Clear **lack of awareness** of OS policies and, in some extent, practices:
 - OS mostly associated to Open Access and Open Data
 - Other OS practices (e.g. Open Methodology, Open Peer Review...) were not known
 - Open Source/Open Code is not associated to OS

2b. Barriers and incentives: Open Data (1)

- Reluctance to share/make available data generated within the PPP, at least in an early stage
 - *“Not before data have been completely used up”* - Senior Bioinformatics Principal Investigator
 - *“Results dealing with new, large data sets are prone to get published in high impact journals (...) nobody would dare to jeopardize a Nature or Science paper”* - FP7 Project Coordinator
- Differing views on what can and cannot be shared
 - Depending on the role on the project (e.g. data generator vs data analyst)
 - Depending on scientific field and applications (e.g. computational biology vs drug development)

2b. Barriers and incentives: Open Data (2)

- Shared data is rarely “annotated” with findings obtained from the data, which limits its reuse by third parties, outside the PPP, and to further build on generated knowledge
 - *“Policies and publications do not encourage such data annotation (...) Just releasing data is only useful for replicating existing work on larger datasets” - FP7 Project Coordinator*
 - Exception: some cohesive communities around specific topics or model organisms (e.g. FlyBase on Drosophila).

2b. Barriers and incentives: Open Data (3)

- Knowledge/know-how (tacit) used for data collection, processing, analysis and interpretation is often required for data reuse
- Access to such knowledge plays a key role on PPP configuration
 - Even if data is made accessible, the ability to exploit it is what makes the difference in entering research partnerships
 - Incentive to open data, specially by companies, in order to get access to external academic know-how (e.g. Open Targets)

2b. Barriers and incentives: Open Source (1)

- Motivation for open sourcing?
 - It makes research enabling technologies and methods transparent and auditable towards peer reviewing and publication
 - It is a standard practice in some communities (e.g. Bioconductor)
 - EC “buys it” as a good practice for ensuring project impact and dissemination of results

2b. Barriers and incentives: Open Source (2)

- Open source projects and solutions developed within Life Sciences PPP are highly specific, tailored to the needs of the project
 - Low/uncertain interest outside the partnership?
 - Communities around such PPPs results are seldom consolidated
- In-depth knowledge of software and solutions resulting from PPPs is required for its reuse
 - *“Even if our software is open source, companies and customers knock on our door asking for support (...) ensuring future collaborations and revenues for the research group”* - Bioinformatics Group Leader

Preliminary findings

- Lack of **awareness** of OS by “common” researchers
- Reluctance to share, mainly driven by **competition** among researchers
 - High impact publications, future collaborations, subcontracting opportunities...
- Role of **tacit knowledge** in OI/OS
 - Key to configuration of partnerships
 - Potential barrier to the reuse of scientific results and knowledge generated by partnerships
 - Limit to the expected impact of OS on OI (but also an incentive to share?)
- *Convergence of OI and OS: OS fueling OI?*
- *How STS may contribute to better build and operate OI/OS partnerships?*