The European Project OpenUP: OPENing UP New Methods, Indicators and Tools for Peer Review, Impact Measurement and Dissemination of Research Results

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Abstract. Open Access and Open Scholarship are substantially changing the way scholarly artefacts are evaluated, published and assessed, while the introduction of new technologies and media in scientific workflows has changed the "how and to whom" science is communicated, and how stakeholders interact with the scientific community. OpenUP addresses key aspects and challenges of the currently transforming science landscape. Its main objectives are to: (i) identify and determine new mechanisms, processes and tools for the peer-review of all types of research results (publications, data, software, processes, etc.); (ii) explore, identify and classify innovative dissemination mechanisms with an outreach aim towards businesses and industry, education, and society as a whole; (iii) analyse and identify a set of novel indicators that assess the impact of research results and correlate them to channels of dissemination.

OpenUP is engaged with research communities from life sciences, social sciences, energy, arts and humanities, implementing a series of hands-on pilots to assess and verify the proposed new mechanisms for the cycle review-disseminate-assess, to understand how these mechanisms correspond to the requirements and needs of the research communities. The final outcome of the project will be a set of concrete, practical, validated policy recommendations and guidelines for all stakeholders, namely academia, industry and government institutions.

Keywords: Open access · Open science · Open scholarship · Peer review
Impact assessment

1 Objectives

Open Access, Open Science, Open Scholarship accompanied by sharing enabling technologies, have revolutionized the way scholarly artefacts are evaluated, published and assessed. These developments have also changed the requirements and practices of the involved stakeholders, namely researchers, publishers, funders, institutions, industry and the public. The exponentially growing research output, the increasing demand for a more open, transparent and reproducible science, as well as apparent shortcomings in present quality assurance and evaluation methods require key stakeholders to re-think the very nature of how the quality of research artefacts is evaluated. In addition, novel and innovative ways of disseminating research outputs revolutionise the ways how and

G. Serra and C. Tasso (Eds.): IRCDL 2018, CCIS 806, pp. 240–248, 2018.
https://doi.org/10.1007/978-3-319-73165-0_24

to whom science is communicated, and how stakeholders interact with the scientific community.

Traditional ways of publication and evaluation do not satisfy the needs of this changing landscape and currently there are more open questions than answers. How can we determine and ensure the quality level of research artefacts, if the standard evaluation methods are no longer useful? Which metrics can be used to evaluate new forms of publishing (data, software), which go beyond the traditional bibliometric used for books and papers? How do technological advancements and the integration of Open Science workflows and behaviours affect the new landscape? How do different stakeholders measure the impact of science? How do we adapt the policy framework so that it becomes more open and gender sensitive? How can we measure the impact of research findings on society and businesses outside the traditional evaluation and publishing channels? What are the new business and pricing models that need to be put in place?

The review-disseminate-assess cycle is a multifaceted process involving different stakeholders:

- Publishers, who have yet to understand and adapt to new reviewing methods, and still measure their success through bibliometric;
- Researchers, especially the young ones, who instinctively find novel ways to disseminate their research but are lacking a way to measure their success;
- Policy makers (e.g. funders), who strive to make evidence based assessments but do not have the tools to move beyond the current status quo;
- Institutions, who need to integrate new indicators for researcher career advancement, adapt to emerging business models for journal subscriptions, expand their services for data management, or assess their research outcome;
- Citizens and industry who use science and implicitly increase the scientific impact.

There are already many initiatives and projects addressing an "open peer review process", or addressing new and different impact indicators, or experimenting innovative dissemination methods (see the Reference section for a selected bibliography). OpenUP intends to push forward these fields by addressing the key aspects and challenges of the currently transforming science landscape in terms of quality assurance, communication of scientific outputs, and impact assessment with a focus on Open Science developments. The main objectives of the project can be summarized as follows.

- *Explore, analyse and promote open peer review mechanisms*. Identify and determine novel mechanisms, processes and tools for peer-review for all types of research outcomes. Investigate and understand how these are adapted and applied in an Open Science, e-Infrastructure enabled environment. One of the relevant emerging trends is the requirement to save and assess the "Research Flow", i.e. the process by which research results are produced by applying a certain methodology to certain data. OpenUP is studying how peer-review practices and methods can be applied, adapted and extended beyond articles, books and monographs to include research data, research flow and software.
- *Explore and promote innovative methods of research dissemination and communication*. Explore, identify and classify innovative dissemination mechanisms and their effectiveness, suitability and impact. Study communication mechanisms that go

beyond the traditional scientific academic venues with an outreach aim towards businesses and industry, education, and society as a whole.

- *Define research metrics and indicators for different stakeholders*. Collect a set of indicators that assess the impact of various types of research results in an open, social network savvy environment, and put them into perspective in terms of channels of dissemination. Investigate the commonalities and differences on how these are perceived, adapted and used by the various research communities and involved stakeholders.
- *Validate the OpenUP framework with community driven pilots*. Engage with research communities from life sciences, social sciences, energy, arts and humanities, and implement a series of hands-on pilots to assess and verify the proposed new mechanisms for the cycle review-disseminate-assess, to understand how these mechanisms correspond to the requirements and needs of the research communities.

2 Overall Approach

OpenUP is following a phased approach over its three main pillars of Review-Disseminate-Assess. These phases, namely Landscaping – Initial analysis – Assessment and validation – Policy review – Synthesis (see Fig. 1), will feed to and run in parallel to an intensive awareness and dissemination activities. All results from one phase will be fed into the next phases, while they will also be made public for consultation through the OpenUP's platform.

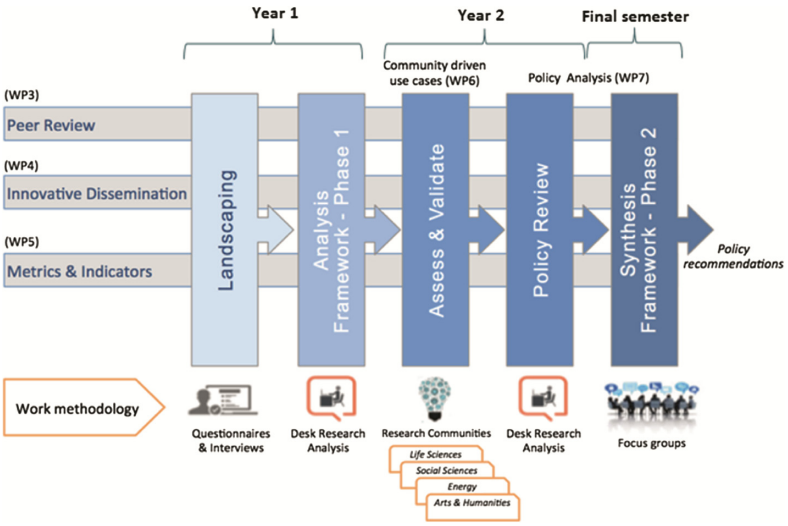

Fig. 1. OpenUP overall methodology

The project, started in 2016, has completed the phases for Year 1 (Landscaping and Analysis Framework – Phase 1) and just started the Assess & Validate phase.

One of the milestones of the project is the creation of an Open Information Hub, a collaborative web based Knowledge Base that will host a catalogue of open tools/services, methodologies, best practices from various disciplines or settings, success stories, reports. More specifically, the OpenUp Info Hub will include:

- a catalogue of open peer review methodologies, initiatives, tools and services; facts and recommendations for metrics and indicators targeted to different stakeholders;
- a directory of innovative dissemination and outreach methods accompanied by good practice guidelines;
- a blog open to the community to host experiences and opinions on any of the OpenUP related aspects;
- a section with user guides, recommendations and FAQs for different categories of stakeholders (young researchers, publishers, funders, policy makers, etc.).

The beta version of the OpenUp Info Hub is presently online and can be visited at: https://www.openuphub.eu/.

2.1 Landscaping

This phase determined traditional and ground-breaking mechanisms, processes and tools for peer-review, dissemination, and measuring impact of all types of research results. Using a variety of tools the OpenUP team has scanned the current landscape of traditional and innovative methods, tools and practices across disciplinary, thematic, regional, gender and age borders.

One of the main tools supporting the landscape scans has been a survey conducted between 20 January and 23 February 2017. Following the principles of the project, the questionnaire and the complete data sets of the survey are available at Zenodo, one of the best sites supporting Open Science (http://doi.org/10.5281/zenodo.556157).

Peer review: This landscape scan has liaised with similar initiatives (e.g., OpenAIRE's current task on Open Peer Review Systems, which is performing a similar landscaping study, and publishers like F1000 or Frontiers who have advanced ICT enabled peer review systems) and has recorded the processes.

Dissemination: This landscape scan has covered publication approaches as offered by traditional media (e.g. article in newspaper), industrial media (e.g. report as part of a weekly research related magazine) as well as social media (e.g. tweet). OpenUP has also examined and interviewed selected FP7 or H2020 projects to see how they use such dissemination approaches and the impact they gain.

Impact and assessment: This landscape scan has recorded existing and emerging indicators and how they are used in different settings or applications. The main tools here have been surveys and interviews to see what secondary impact indicators (e.g., job growth, societal impact) are important in which setting, and how they can possibly be measured.

Results of the landscaping activity for the three aspects of the research activities (peer review, dissemination and assessment) are available as project deliverables on the OpenUp project web site (http://openup-h2020.eu/project-materials/project-deliverables). Content from the deliverables has also been reworked and reformatted to be

included in the OpenUp Info Hub (https://www.openuphub.eu/), which provides also an initial set of tools to help implementing the Open Science paradigm.

2.2 Analysing – Framework Phase 1

Based on the landscaping results, OpenUP is presently completing desk analysis to come up with an initial framework for each of the three OpenUP pillars. Specifically, it will produce an interim framework document that will:

- catalogue requirements from different stakeholders
- break down processes to identify commonalities and gaps
- define the qualitative and technical criteria to classify the processes
- define the interrelations among the three pillars and place them within the research workflow.

2.3 Assessing and Validating

During this phase OpenUP will carry out a series of activities to test and validate the proposed innovative mechanisms and indicators against the requirements and needs of key stakeholders (e.g. researchers, funders, innovators, general public). The aim is to deliver first insights into the applicability and practicability of the proposed methods in specific settings and communities, as well as reflect on their effects on the stakeholders involved and on the scientific workflows.

Based on the initial findings, OpenUP is engaged in the rolling-out of seven pilots related to the three pillars, spanning several research communities and initiatives from the life sciences, social sciences, energy, arts and humanity disciplines. The selected communities are: the European Machine Vision Association (EMVA), the eHealth 2018 Student competition, the Human Mortality Database (HMD), DARIAH, Coursera community, the Smarter Together project, and the Berlin Institute of Health. Presently, OpenUp is consulting with the communities to define and refine the implementation and logistics of the pilots to ensure that they reflect the hitherto defined/identified roles, processes, challenges, opportunities as well as identify key questions that may need further investigation.

2.4 Policy Reviewing

The question of how the research findings are (and should be) linked to policy is of direct relevance to OpenUP. Linkages between research and policy may well vary among the three key project pillars, disciplines, research communities and between member States, depending on their overall structuring. It is therefore important to map and analyse the national contexts and existing policies in order to understand areas where the project's findings and recommendations could support evidence-based Research and Innovation policy. OpenUP is presently carrying out several activities to gather and analyse policy data and produce summary reports. In addition to desk research and analysis of available literature, also field research is being carried out, through interviews with policymakers

and survey of key stakeholders in selected countries from the EU-15, EU-13 and Associated Countries (8 countries in total).

2.5 Synthesizing – Framework Phase 2

The last phase of OpenUP will produce a set of practical policy recommendations for EU, national and institutional policymakers for supporting the transition to appropriate and timely measures of quality assurance related to peer review, innovative dissemination of the and their impact measurement. Based on the previous phases, OpenUP will gather all findings (individual frameworks related to the OpenUP pillars, consultations, feedback from validation activities and use cases, policy reviews), will evaluate possible collaborative initiatives between key stakeholders, including researchers, peer reviewers, publishers and policymakers when using the developed approaches and tools to support evidence-informed research and innovation policy. This will be accomplished by: (a) performing a SWOT analysis to propose optimal ways and good practices for implementing the policy in the different European settings and research communities; (b) validating results in focus groups.

3 Work Plan

The project is organized into seven work packages, with the usual structure of the European projects. The relationships among the work packages are shown in Fig. 2.

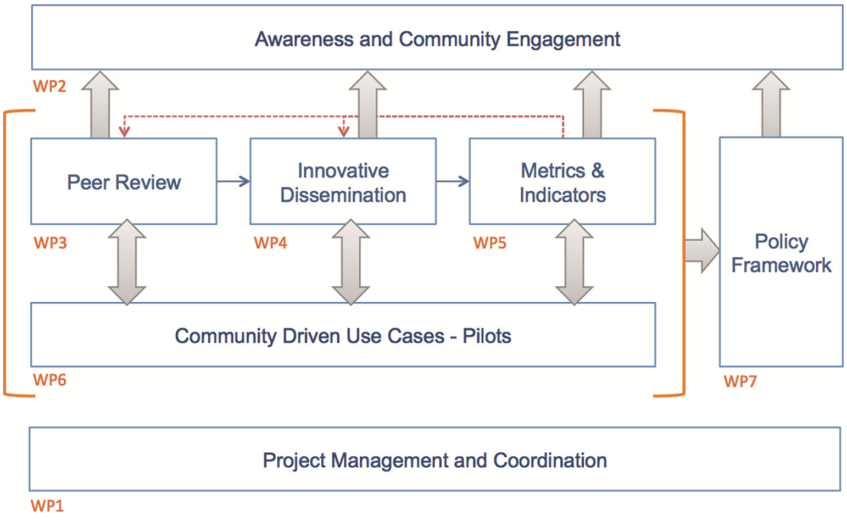

Fig. 2. OpenUP work package relations

WP1 – Management and Coordination is dedicated to the management, coordination and monitoring of the project and enable the efficient progress of its work meeting the contractual obligations and the quality expectancies of the consortium. It also addresses the project's data management plan and implementation.

WP2 – Outreach and exploitation covers a diverse set of activities that relate to raising awareness about the project in domains of interest and building the instruments for the uptake of the results (framework, pilots, Open Information Hub, recommendations. It also investigates the sustainability model for the long-term operation of the OpenUP communication platform and Information Hub.

WP3 – Peer review framework produces a framework for open peer review on all research artefacts, facilitating a clear definition of the roles and processes, identifying benefits, challenges and opportunities to select questions that need further investigation.

WP4 – Innovative dissemination framework investigates innovative ways of disseminating research outputs beyond traditional academic dissemination in different disciplines, identifying and sharing good practices. The work comes up with practical guidelines on how to create a successful research dissemination strategy beyond traditional academic dissemination.

WP5 – Impact indicators framework generates a validated taxonomy of channels of scientific knowledge dissemination and transfer channels and suggests indicators enabling assessing impact and quality of the underlying research.

WP6 – Community driven use cases and pilots actively engages research communities to validate the frameworks through a set of pilots, elicitating requirements and exploring viable solutions for implementing technical and processual solutions, and getting concrete insights for future research.

WP7 – Policy analysis, recommendations and guidelines is responsible for turning all OpenUP results into practical guidelines and policy recommendations for EU/national/institutional policy makers.

4 The Project

Open UP started in June 2016 and will end in December 2018 (30 months). The nine partners are listed in the Table below. The total cost of the project is about 2.225.000 Euro, with an EU contribution of about 1.950.000 Euro

(see http://cordis.europa.eu/project/rcn/203537_en.html).

All the details of the project can be found at the project web site (http://openup-h2020.eu/). As stated above, the results, recommendations and tools developed by the project can also be found at the OpenUp Information Hub (https://www.openuphub.eu/)

No.	Participant full organization name	Short name	Country
1	Public Policy and Management Institute (Coordinator)	PPMI	LT
2	Georg-August-Universitaet Stiftung Oeffentlichen Rechts	UGOE	DE
3	National and Kapodistrian University of Athens	UoA	EL
4	Universiteit van Amsterdam	UvA	NL
5	Graz Kompetenzzentrum fur Wissensbasierte Anwendungen und Systeme Forschungs- und Entwicklungs GMBH	KNOW	AT
6	Austrian Institute of Technology	AIT	AT
7	Institut für Forschungsinformation und Qualitätssicherung	IFQ	DE
8	Frontiers Media SA	Frontiers	CH
9	Consiglio Nazionale delle Ricerche	CNR	IT

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