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## Open Science in Greece: connecting the dots

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### Abstract:

*Objective: Examines operations of the Athena Research Centre in supporting open science in Greece.*

*Methods: Discusses the work involved in the OpenAIRE, RDA Europe and HELIX (Hellenic Data Service) initiatives, and how stakeholder involvement was achieved, along with necessary training.*

*Findings: The case study demonstrates the importance of collaboration, developing infrastructure, supporting necessary legislation, and providing services (e.g. for data management).*

*Conclusions: Monitoring and support services are necessary to enable compliance with open science and FAIR best practice in data management. Progress so far is aligned with European directives and recommendations.*

**Keywords:** Open Science; scholarly communication; scientific research culture; Greece

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### Introduction

Open Science (OS) lies at the heart of Research and Innovation strategies in the European Union (EU). Developments in OS policies and infrastructures support and enable the implementation of the European Commission's (EC) objective for a unified and sustainable open research environment. The updated Recommendation on access to and preservation of scientific information, the Open Science Policy Platform and the EOSCpilot project

recommendations, as well as the European Open Science Cloud, are successful OS paradigms towards that direction. In response to the EC's strategic direction, all EU countries are either developing or revising policies, infrastructures and services to support Open Science at a national level. Keeping up with the European flow, there is the need to identify the enablers of Open Science in the current academic and research ecosystem nationally, and coordinate developments in accordance with the European guidelines. Greece has been active, though in a fragmented way, in several OS areas, such as open access, open source software, data management and protection.

This paper presents an assembly of intertwined and complementary activities, collaborations, discussions and goal-setting for the implementation of Open Science policies and practices in the Greek research area, as initiated and driven by Athena Research Center (ARC). It concentrates on the latest efforts and achievements of three projects that are coordinated and managed by ARC: OpenAIRE, RDA Europe and HELIX (Hellenic Data Service).

This case study highlights the means reclaimed and the mechanisms mobilized to achieve a better understanding of the current national Open Science scenery, engage with stakeholders, and foster training on open and FAIR best practices. Finally, it shows communication paths and more strategic approaches established for the alignment of policy developments both internally, to connect Research-Innovation-Society, and externally, to reach a strong representation at the European Open Science Cloud (EOSC).

## **Aims**

Open Science (or Science 2.0) is driven by Responsible Research and Innovation and is most frequently associated as being a collection of open movements' characteristics. The Open Source and Open Access (OA) movements are considered to be the first, and most mature in terms of developments and adoption by the academic and research community globally. Open Science concerns both the outputs of research endeavours (publications, data, software, etc.) and the research activities throughout the research lifecycle. Most importantly, Open Science fosters collaborations and enables knowledge sharing to achieve information and services accessibility and re-usability, thus promoting, among others, validity and better quality of results, as well as faster developments in both science and innovation.

FOSTER Plus (<https://www.fosteropenscience.eu/foster-taxonomy/open-science>), provides a taxonomy for Open Science drawn from Open Science training material that it indexes. This taxonomy, though not comprehensive, provides a good overview of Open Science elements: Open Access, Open Data, Open Reproducible Research, Open Science Definition, Open Science Evaluation, Open Science Policies, Open Science Tools. Bosman and Kramer (2017) describe the "six SHADES of open" position Open Knowledge in the core of open movements, like Open Source, Open Hardware, Open Access, Open Data, Open Educational Resources, Open Science (<https://im2punt0.wordpress.com/2017/03/27/defining-open-science-definitions/>). The study by Salmi (2015) provides valuable information on drivers and enablers for Open Science, such as Shared Global Challenges or Open Resources and Shared Facilities and Capabilities, respectively. An overview of Open Science dimensions in the wider society includes, among others, citizen science and public policymaking, while components in the tertiary education involve peer learning and open collaboration.

Recognizing the benefits of Open Science, the EC has positioned it at the epicentre of its R&D programmes for it is also expected to contribute in the fulfilment of the Innovation Union

flagship, “one of the 7 flagship initiatives of the Europe 2020 strategy for smart, sustainable and inclusive growth” ([https://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication-brochure\\_en.pdf](https://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication-brochure_en.pdf)). On that note, two of the major European achievements are the enforcement of OA policies for scientific publications ([http://ec.europa.eu/research/participants/data/ref/h2020/grants\\_manual/hi/oa\\_pilot/h2020-hi-oa-pilot-guide\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf) ) and data and the EOSC, an open, secure, trusted environment for research practice in Europe.

An increasing number of countries and public stakeholders upheld an active role in the academic and research fora to embrace this new paradigm. ([https://eoscpilot.eu/sites/default/files/eoscpilot\\_d2.7\\_submitted.pdf](https://eoscpilot.eu/sites/default/files/eoscpilot_d2.7_submitted.pdf)). Stakeholders represented in open research ecosystems are policymakers, Public Funding Organisations, Research Infrastructures, e-infrastructures, Academic Libraries, Universities, Research Centres, initiatives that are active in the Open Science area, including citizen science projects, and Industry. Many countries adopted Open Access/Open Science and Open Data policies while others include Open Science plans and roadmaps in national R&D Strategies.

Ongoing European projects have also responded to EOSC by allocating resources and introducing new objectives in their initial plans to support EOSC realisation according to their area of OS expertise. More specifically, OpenAIRE is considered one of the pillars of EOSC, being the pan-European infrastructure for open knowledge that launched back in 2008 as a response to the EC’s need to get a better view of the research that it funds and of the quality and integrity of its scientific outcomes. In support of this mission, OpenAIRE built and operates a strong technical network providing solutions that enable interoperability between repositories thus enhancing visibility of their content. To ensure OS uptake and compliance with European mandates and standards, technically and policy wise, it has established a dedicated group of experts, namely the National Open Access Desks (NOADs). Each NOAD represents a specific country, currently counting to 34 associated members. Additionally, RDA Europe, the European plug-in to the Global forum of Research Data Alliance (RDA) is funded by the EC and aims to foster collaborations between researchers and adoption of RDA outputs in the area of research data management. RDA Europe took a similar approach to that of OpenAIRE and introduced national RDA nodes to accelerate regional research data developments and to communicate policy demands to Governments.

Athena Research Centre’s involvement in these projects, as coordinator of the OpenAIRE Greek NOADs and RDA Greek Node, places an emphasis on the communication and compliance with EC requirements and on the EOSC national settings implementation. ARC strives to influence collaborations and coordination of national activities, as well as to promote and support adoption of OS best practices for incorporation into national projects. Particularly for the latter, ARC manages the development of Hellenic Data Service, also known as HELIX, which is an ongoing project funded by structural funds producing services in support of data-intensive science. HELIX is comprised of a data catalogue and repository with features and functionalities for data analysis that facilitate responsible research conduct while easing compliance with Open and FAIR practices in the Greek research area.

The three projects that are presented in this paper have their own, diverse set of goals and objectives, but all eventually contribute to coordinating national OS activities and influence policymaking at the macro and micro level. Consequently, this case study gives insight to a putative OS roadmap as it has been imprinted in ARC’s efforts through the aforementioned

projects, and beyond. It also highlights challenges and good paradigms as identified throughout implementation of these actions.

## **Methods**

ARC is deeply involved in Open Science initiatives, both at the European and at the national level. Through these channels, it supports the development of OS policies, along with the operation of open and FAIR infrastructures and services while ensuring OS uptake with training, nationally and institutionally. On this policy-infrastructure-training nexus, work targets all possible key national OS stakeholders and is driven by a variety of ventures, in alignment with OSPP Recommendations, such as the following:

- a. Landscape reviews, in the form of surveys or desk research, to obtain a comprehensive understanding of the state-of-the-art on Open Science.
- b. Awareness and engagement activities, such as webinars, face to face meetings and workshops, to ensure best practices in Open Access and FAIR data management are communicated and their implementation is supported, also in compliance to the EC conditions.
- c. Training of professionals, including train-the-trainer approaches, for enabling a smooth transition to integrating and following open and FAIR practices at all levels.
- d. Services that comply with open and FAIR principles and with the EOSC, to provide stakeholders with access to appropriate for their open research tools and working environments.
- e. Helpdesks oriented towards Open Science, spanning advice provision and guidance, through open access publishing issues, legal and policy related issues to matters concerning interoperability and technical specifications.
- f. Collaboration and coordination regarding all of the above with an ultimate goal to co-develop a unified and easily sustainable national OS ecosystem that acknowledges its strengths and weaknesses and is fully adjusted to the EOSC setting.

In that context, the next section explains the steps undertaken by ARC, which could be summarised in a set of recommendations and respective actions.

## **Results**

Inside ARC, there is a good communication flow between the three projects and beyond. HELIX, being a national e-infrastructure for research, receives advice from the OpenAIRE Greek NOADs and RDA Greek Node, so that best practices for open publishing and FAIR data management are incorporated in the development of its services and tools. HELIX is also indirectly connected to the EOSC Architecture Working Group (WG) and therefore it keeps up with the EOSC framework and standards. Moreover, OpenAIRE Greek NOADs and RDA Greek Node utilize HELIX services in their engagement activities, especially with research communities and researchers, to bear light on the more practical aspects of Open Science. HELIX enables researchers' compliance for the needs of their H2020 projects and facilitates the transition to adopting open practices by providing trainings. Hence, it is considered as a good paradigm for other national service providers to follow by incorporating HELIX practices to their services, by sharing their services and expertise with HELIX, and/ or by making use of HELIX in general. Apart from informing about and ensuring technical provisions are followed nationally, OpenAIRE Greek NOADs and RDA Greek Node work concentrates on policymaking. OpenAIRE supports policymaking of Research Performing Organisations

(RPOs) and Research Funding Organisations (RFOs) via a policy toolkit that was developed for that purpose. That includes checklists to assess the readiness for adopting an Open Science policy, and model policy templates to ease the authorship process. Complementary, RDA Europe Node communicates national data demands to RPOs and RFOs to be taken into account for the policies they form.

The way that the three projects utilize the means described in the previous section and apply them in the Greek research area to foster policymaking, cultural change, technical implementation and compliance with OS conditions and with EOSC, are presented as recommendations for consideration.

## Step 1 Know your people

### a. Identify the national stakeholders and understand their role in the national research ecosystem

The first step before preparing for any activity is to know the organisations and bodies/structures that are involved, either more or less prominently, in open endeavours in the country. It is more efficient to have one contact point, a representative that can communicate directly, using the proper language, with the communities that it represents than attempting to reach out to individuals who are active in these communities, therefore decentralising information exchange. At the same time, this practice highlights national expertise in the areas of Responsible Research and Innovation (RRI) and OS which proves to be vital for redirecting purposes in support of all kinds of stakeholder queries.

A mapping exercise based on the stakeholder categories listed on the OSPP Recommendations and the EOSCpilot D2.7 Final Stakeholder Map, shows that the Greek OS stakeholders, according to their area of expertise (Figure 1, Table 1).



Figure 1: Greek stakeholders per stakeholder category

### b. Establish strong collaborations

Collaborations, both internal and external, are essential for a healthy thriving research environment where everyone can thrive on. Interactions should be characterised by open communication at every level and among all stakeholders, thus raising awareness to and understanding of everyone's benefits and maximising positive outcomes. But, the aims and interactions are different for stakeholders with higher influence, national political leadership and stakeholders affected by those developments. In Greece, communication between the General Secretary for Research and Technology (GSRT), which is part of the Ministry of Development and Investment, and key OS stakeholders is encouraging. It is worth mentioning that GSRT very early on realised the advantages of EOSC and in 2017 initiated an Open

Science Working Group (WG) aiming to deliver a national OS strategy in light of the new European advancements.

Stakeholder category	Stakeholder name	Area/ coverage
<b>National policymakers</b>	Ministry of Education Research and Religious Affairs	Enforcement of national law and policies
<b>Research Funding Organisations</b>	General Secretariat for Research and Technology (GSRT)	Funding research projects and infrastructures
	Hellenic Foundation for Research and Innovation (HFRI)	Funding research projects and individuals
<b>Research Organisations</b>	Council of Research Centres	Research Centres
	Rectors Synod	Universities
	National Documentation Centre (EKT)	Enabling e-publishing
<b>Libraries</b>	Hellenic Academic Libraries Link - HEAL-Link (SEAB)	Supporting research conduct
<b>Nodes/Structures (Open Science facilitators)</b>	OpenAIRE Greek NOADs	Supporting all stakeholders to comply with EC policies
	RDA Greek Node	Supporting research data in Greece
	EOSC Secretariat WGs national representatives	Communication with the EOSC
	Open Government Partnership (Greek representation)	Supporting open data in Greece
	Open Technologies Alliance - GFOSS (EL/LAK)	Open (Source) Software and Hardware
	Creative Commons Greece	Machine readable licenses
	Greek University Network- GUNET	Open Educational Resources and Textbooks
	VouliWatch	Enabling open dialogue between citizens and Political Leadership
<b>Research Infrastructures</b>	ESFRIs	All Greek Research Infrastructures
<b>e-infrastructures</b>	Greek Research and Technology Network - GRNET (EDET)	E-infrastructure network for research in Greece
	HELIX	National Research e-infrastructure
	e-IRG (national representation)	e-infrastructures
<b>Industry/SMEs</b>	Hellenic Federation of Enterprises (SEV)	
	Hellenic Industrial Property Organisation (OBI)	Research results exploitation/ patents

Table 1: Greek Open Science stakeholders

ARC is part of the GSRT's WG, some objectives of which it backs up and accelerates through a newly established bottom-up Open Science Task Force. This Task Force, though initiated and coordinated by ARC, is a collective effort between key national players to develop a national OS strategy focusing on sustainability issues, the interaction with EOSC, and adoption of institutional OS policies in a harmonised way.

In addition, through OpenAIRE, links with the Hellenic Academic Libraries Link (HEAL-Link) were created to boost compliance with EC mandates in terms of institutional OS policymaking and repositories' interoperability. Moreover, as a partner in the Greek OpenAIRE NOADship, HEAL-Link work focuses on the institutional aspects of OS in Greece. HELIX also empowers HEAL-Link, by providing a data catalogue and repository (HARDMIN) for its members, repurposing the software stack of HELIX and providing interoperability with the broader HELIX ecosystem of services.

Furthermore, to cover the area of data management and training for the research communities that are far from the institutional influence of HEAL-Link, collaborations with Research Infrastructures were sought. These vary from giving presentations in webinars or events to encouraging actual participation of domain researchers in Open Science initiatives. That allows for knowledge exchange and best practices awareness in specific disciplines, but also helps with improving national representation in OS areas. Some examples are the Greek translation of the FOSTER Open Science Training Handbook and the creation of a FAIR guide for Nanotechnology and Material Science.

## **Step 2 Prepare for the Open Science era**

### **c. Understand the current state of Open Science in the country**

An equally important step as to the identification of national stakeholders is knowing the OS components that are already in place or underway. This is possible usually through landscaping reviews in the form of desk research or surveys. To increase participation and derive accurate results, these processes should be driven by co-operations, especially when targeting stakeholders other than the type your organisation represents.

Bearing that in mind, there were a few attempts to capture the OS strengths and weaknesses in Greece, as described below.

### **d. Policies and national legislation**

To understand what is being followed in accordance to EC Directives and Recommendations along with personalisations of the type of permissions and exceptions or limitations accruing from the current legal and policy framework regarding "openness" and FAIR data management.

Desk research showed, among other things, that Greek Law 4310/2014 supports open access to publicly funded research, without however having implemented a national Open Access/Open Science policy yet. Additionally, Law N. 3979/2011 on E-government and relevant regulations with amendments up to Law N. 4483/2017 and Law N. 4305/2014 on Open Access to and Further Use of Public Sector Documents, Information and Data with amendments up to Law N. 4483/2017 support Open Data activities by provisioning specifications of public bodies' infrastructures and by including the use of Creative Commons licenses to some outputs.

A questionnaire produced with HEAL-Link and shared with all academic libraries, unveiled that many libraries are still developing OA policies to support open practices mainly referring to appropriate use of their literature repositories.

#### **e. Infrastructures and Services**

To estimate the levels of preparedness in terms of implementing a national OS ecosystem and of providing researchers with the means, the tools they need to meet the Open and FAIR conditions in the European Research Area (ERA)

#### **f. Hardware and networks**

The foundations of digital and e-science lies at the hardware and Internet networks in place. Without data centres and appropriate tools, like routers, switches, access points, bandwidth, no scientific behaviour would be feasible in online environments. GRNET, the Greek Research and Technology Network, develop and run a pool of infrastructures and services for research and innovation. Such examples involve connectivity or remote access to Internet servers with provision of VPNs.

#### **g. Computing**

In support of data processing, GRNET offers computing infrastructures, including cloud based computing. Infrastructures that GRNET has developed for that purpose accommodate both simple calculations and data intensive analyses as they appear in Big Data scales. For example:

- HPC ARIS: an infrastructure for large scale scientific applications
- Okeanos Cloud computing services: offering cloud services in the form of Infrastructure as a Service (IaaS)

At last, for the distinction between e-infrastructures and research infrastructures and respective service providers, it should be noted that the infrastructures and services offered by GRNET are discipline agnostic and therefore can be used by everyone fulfilling general research needs, such as using an HPC infrastructure to provide the required power of the data process. On the other hand, RIs answer to domain specific demands of researchers thus accommodating tailored needs such as acquiring a helicopter for geodata collection or locating specific sensors on boats and ships for the field of marine and fisheries.

#### **h. Services: Repositories**

In terms of storing and preservation services, the OpenAIRE Greek NOADs questionnaire targeting academic libraries showed that almost all of them have developed and run a literature repository. More technical questions highlighted specific capabilities of the literature repositories which led to a prioritisation exercise for repository software alterations and updates in order to become OpenAIRE compliant . That means to follow the OpenAIRE metadata guidelines for achieving greater interoperability and visibility of their outputs.

Interactions with national stakeholders unveiled that only a minority of RIs provide repository services, e.g. So.Da.Net, but that, overall, there is good provision for national platforms regarding open and FAIR data publishing. Great examples are:

- Didaktorika: by law, collecting and storing Greeks PhD theses in the long term
- E-publishing: assisting the development of open access journals
- HELIX Pubs: a publications harvester, collecting metadata records from national and institutional literature repositories, including OpenAIRE compatible repositories
- HELIX Data: a data catalogue and repository, with a dual role in storing and preserving data that are self-deposited by researchers as well as in harvesting data records from other national data sources and catalogues

### **i. Data management services**

As already mentioned, desk research revealed GRNET's infrastructures for data processing. Through these infrastructures, GRNET provides services for data storage and analysis, but also for data access and security. Key services falling in those categories are, but not limited to:

- Application programming interfaces (APIs): for access to all (meta) data features at once
- Authentication and Authorisation Infrastructure (AAI): for controlling and managing access rights
- ViMa: for providing Virtual Machines (VMs)

Persistent Identifiers (PIDs) for identification of digital documents and objects are provided by GRNET, however not all stakeholders use EPIC. HEAL-Link, for example, has acquired ORCID and Datacite for its institutional literature and data repositories.

With HELIX being a convergence between GRNET, ARC and University of Thessaly, all infrastructures and services available for data management are incorporated under the umbrella of HELIX Lab. HELIX Lab is a pool of tools for (big) data analysis, allowing for data intensive research to be performed by utilising cloud computing networks and High Performance Computing infrastructures.

A major aspect of Research Data Management is the Data Management Plan which is a living document explaining the data management process followed and promoting data re-use. OpenAIRE collaborated with EUDAT, the Research Data Services, Expertise & Technology Solutions, to develop a machine-actionable DMP tool, the OpenDMP tool that it provides to all stakeholders for free.

### **Step 3 Monitoring services**

#### **j. Monitoring is essential to measure the impact of a policy enforced and, if prescribed, to assist enforcement of sanctions for misconduct.**

Although there is no national mechanism that measures Open Science, or any aspects of OS (e.g. openness or FAIRness) in Greece, OpenAIRE provides monitoring services for RFOs and RPOs. Moreover, OpenAIRE Dashboard for Content Providers include metrics for use by its compliant repositories while funders' measurements of OS are supported by OpenAIRE Funder Monitoring Dashboard.

#### **k. Training**

Skills are the salt of data management in EOSC - aspiring to cultivate Open Science literate students and scientists. Training in open and FAIR practices is offered by a variety of Greek stakeholders, though in a fragmented way. For example, it is known that some RIs, run dedicated training programmes for researchers working in the spectrum of the given discipline, such as the ELIXIR-GR does for the Life Sciences. Others, organise extended seminars following traditional educational approaches, such as the Apollonis Summer School for the Digital Humanities. OpenAIRE invested in a training programme for Greek academic librarians to acquire essential data skills. Also, together with HELIX, they provide training in theoretical Open Science matters as well as in proper and most advantageous use of services for all stakeholders.

#### **Step 4 - Communicate best practices and achievements**

The roots to make an effective cultural shift in the way research is performed and shared comes from spreading awareness to the new trends and practices available and from educating stakeholders on how to implement and follow them in their own area of research and influence. Engagement activities are multidimensional and vary depending on the type of stakeholder performing them, the level of inclusiveness, the audience reached, etc. A great paradigm making use of all of those factors for institutional engagement activities is the Engaging Researchers with Research Data: the cookbook.

In the spectrum of activities performed by the three projects of OpenAIRE, RDA Europe and HELIX, these could be summarised in fit-for-purpose gatherings or more broad and inclusive informal activities. For the prior, that mostly translates to reaching out via emails and to organising face to face meetings so as to communicate in a more “personal” level for issues pertaining e.g. the examination of monitoring processes followed by a funding organisation. On the other hand, for the occasions when wider communication of news and practices is needed, organisation of webinars or workshops and annual summits is the preferred way to go.

Following that, and in order to improve and inspire open and bidirectional information exchange of European and national OS proceedings, OpenAIRE Greek NOADs collaborated with the Cypriot NOAD in the launch of a dedicated webinar series, targeting all stakeholders and “open” enthusiasts. It has been observed that engagement activities are more successful when performed in the language of the given stakeholder, hence the joint webinar series were in the Greek language. Attendance to webinars were dominated by librarians, which justifies the need of Greek librarians to gain new skills and communicate with the global librarian community especially in response to data management demands.

More targeted attempts to inform the research community per se are underlined in the RDA Greek Node and HELIX activities for community building. It is worth mentioning that the two projects follow an early career researcher (ECR) orientation. RDA Europe encourages early career participation in the plenary meetings organised twice a year by RDA, by securing funds available to applicants following a formal evaluation process. Moreover, RDA Greek Node supports networking and promotion of Greek ECRs research through indirect links with the RDA Early Career Engagement Interest Group (ECEIG). HELIX contributes by providing its services to research groups/ teams and University classes for educational and experimental purposes. Additionally, desk research has shown that ELLAK, the Greek Open Technologies Alliance, has been very active in spreading awareness to software engineers and scientists who are producing software during their research endeavours for issues relevant to open software and open source software best practices. Finally, ARC pursue conversations with national public funding organisations so as to inform about OpenAIRE’s solutions in monitoring research grants through the exclusive service of Funder Monitoring Dashboard.

#### **Step 5 Provide support**

Supporting actions on policy, services and training matters are necessary to ensure uptake of OS practices by all stakeholders along with growth and conservation of national open research ecosystems. For long lasting effects, support is usually encapsulated and offered in the form of services. Helpdesks are a type of supporting service widely used for providing assistance in online and physical environments of all sorts.

Formulating collaborations and building networks of practice between all stakeholders, already leads to identification of OS areas supported and therefore to the improvement of national

support systems. OS helpdesks are needed at all levels, national and institutional. Also, their orientation should span from policy related issues targeting policymakers and funders, to legal issues coming across in open access publishing endeavours of researchers, to FAIRness and interoperability solutions for infrastructures and services. OpenAIRE NOADs network has been the key reference point for Open Access issues in Europe, primarily established to help researchers of FP7 and Horizon2020 projects to comply with the given EC requirements. With OA and OS becoming the norm in the European Research Area, NOADs helpdesks have been enhanced to meet all academic and research stakeholders needs. Complementary, RDA Europe Node promotes RDA outputs and recommendations adoption by researchers and research communities within Greece.

Academic libraries have for many years assumed a liaison role in institutions which they use for the greatest advantages of its users, e.g. by communicating with scientific publishers for journals subscriptions or by developing new services in association with the Universities' Information Technology (IT) staff. In Greece, HEAL-Link provides this kind of support for Open Access matters and for the legal side of things has developed the HEAL Legal service. HEAL Legal is a website advising students, researchers, academic and IT staff, even other librarians on Intellectual Property Rights (IPR) issues. In addition, OpenAIRE helpdesks possess a rich collection of guides and factsheets developed in support of open and FAIR technical practices and research conduct as well as of policymaking and implementation processes. An exercise to translate this material from English is underway by the Greek OpenAIRE NOADs and soon the HEAL-Link helpdesk along with individual academic libraries' helpdesks will be enhanced.

Reflecting on the current state of OA in Greek institutions, OpenAIRE Greek NOADs worked together to produce a customised OS model policy template. The template was presented by HEAL-Link at the Rectors Council earlier this year and received approval for further implementation of OS policies in Universities. Following this achievement, OpenAIRE Greek NOADs are organising a hands-on session for academic library managers to coordinate implementing actions on a per occasion basis, to take place at the 25th Panhellenic Academic Libraries Conference, PALC 25.

## **Conclusions**

The activities performed by ARC proves that, overall, Greek foundations on Responsible Research and Innovation are set and efforts are constantly being made to achieve alignment with European Directives and Recommendations. What needs to be incorporated in more stakeholders' practices is openness and FAIRness. Work of OpenAIRE Greek NOADs, RDA node and HELIX will continue supporting that until 2020. Their focus is greater on the national OS setting for the establishment and sustaining of a collaborative environment with all national academic and research stakeholders. Links with industry are included to understand specific IPR complexities and draw an exploitation workflow. The inaugural meeting of the OS TF in September will provide a push in coordination of all steps described in the paper. The project National Initiatives for Open Science in Europe (NI4OS-Europe), which starts in September and spans for 3 years, will also contribute to these developments. NI4OS mission is to be a core contributor to the EOSC service portfolio, commit to EOSC governance and ensure inclusiveness on the European level. The project will be coordinated by GRNET, and ARC will be contributing to the Greek OS initiative as one of NI4OS partners. In the context of NI4OS, a questionnaire is being prepared in collaboration with other EOSC5b projects and with contribution of OpenAIRE Greek NOADs, RDA Greek Node and HELIX. The

questionnaire comes also as a continuation of the landscaping efforts of ARC and aims to highlight the current state of policies, services and training in place by national Research Centres (RCs) and RIs.

In terms of awareness raising, the second series of OS webinars are prepared to launch by OpenAIRE Greek and Cypriot NOADs. In addition, based on the results of the questionnaire targeting RCs and RIs, service providers helpdesks is expected to be enhanced and allow for better communication and collaboration with institutional ones. The role of data stewards also will be examined to see whether a data stewardship programme similar to the paradigm of TU Delft can be applied, both institutionally and nationally, in Greece.

Finally, taking into consideration the EOSC Rules of Participation, the activities of the OS TF will determine the necessity of developing a national service catalogue to be the source feeding the EOSC service catalogue for Greece.

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