

PROJECT PERIODIC REPORT

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Declaration by the scientific representative of the project coordinator

I, as scientific representative of the coordinator of this project and in line with the obligations as stated in Article II.2.3 of the Grant Agreement declare that:

- The attached periodic report represents an accurate description of the work carried out in this project for this reporting period;
- The project (tick as appropriate) ¹:
 - has fully achieved its objectives and technical goals for the period;
 - has achieved most of its objectives and technical goals for the period with relatively minor deviations.
 - has failed to achieve critical objectives and/or is not at all on schedule.
- The public website, if applicable
 - is up to date
 - is not up to date
- To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (section 3.4) and if applicable with the certificate on financial statement.
- All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 3.2.3 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

Name of scientific representative of the Coordinator: Sergio Ruiz



Date: 26 November 2014

For most of the projects, the signature of this declaration could be done directly via the IT reporting tool through an adapted IT mechanism and in that case, no signed paper form needs to be sent

¹ If either of these boxes below is ticked, the report should reflect these and any remedial actions taken.

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Grant agreement no. 312788



**ORCID AND DATAcite
INTEROPERABILITY NETWORK**

www.odin-project.eu

D1.4 Second Periodic Report

WP1 – Project Management

V1_0

Final

Abstract:

This second periodic report describes at a high level the work that the ODIN consortium has carried out in the second year of the project and an overview of the resources used in the project.

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1. PUBLISHABLE SUMMARY

ODIN: ORCID and DataCite Interoperability Network – <http://www.odin-project.eu>

Context

'Data as infrastructure' is a critical concept for a fully-integrated European Research Area (ERA) to drive innovation forward as envisaged in the Digital Agenda for Europe. The lack of data availability hinders this vision. In academic publishing, peer review and citation have long been recognised as mechanisms for endorsing the trustworthiness of research outputs and incentivizing researchers to contribute. Trustworthy research data will only be widely available if the same principles are applied to data publication.

Participative initiatives have emerged to address this challenge. The DataCite consortium has assigned over 3.5 million Digital Object Identifier (DOI) names in the last few years to make research data citable. The Open Researcher and Contributor ID (ORCID) was launched in October 2012 and by September 2014 had over 900,000 researchers and contributors registered. ORCID offers the opportunity to identify individual authors across systems and infrastructures, including scholarly works that can have thousands of authors (as in the case of the High-Energy Physics community). Researchers often change their affiliation, and collaborate across national disciplinary boundaries.

The ORCID and DataCite Interoperability Network (ODIN), a project funded by the European Commission (FP7), aimed to build on the success of DataCite and ORCID by designing an 'awareness layer' for persistent author and object identifiers, thereby reducing technical, cultural and logistical barriers to the accessibility, attribution and trust of data. Identifier awareness will make it possible to stabilise:

- references to a data object;
- tracking of use and re-use; and,

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- links between a data object, subsets, articles, rights statements and every person involved in its life-cycle (creator, editor, reviewer, aggregator, etc.).

Given the importance of these functions as we approach HORIZON2020, we aimed to:

- promote dialogue and awareness around author, data and rights identification and interoperability;
- provide a vision around persistent identifier (PID) interoperability; concretely define and address key interoperability principles;
- analyse these principles within extreme cases in different disciplines, analyse gaps in current infrastructure provision that hinder interoperability and outline key actions necessary to promote future PID interoperability in the scientific data domain in Europe and globally.

The ODIN project was coordinated by The British Library and the ODIN consortium is formed by The British Library (BL), CERN, DataCite, ORCID EU, The Australian National Data Service (ANDS), arXiv and Dryad.

Work performed during the second year

Following the recommendations arising from the Project Review and building on the new knowledge created during the first year, we intensified our communications activities. We delivered tailored-made ODIN presentations in different countries (and continents), aimed at different disciplines and to a diverse set of stakeholders.

We continued exploring the different approaches in High Energy Physics (HEP) and Humanities and Social Sciences (HSS), identifying different practices, tendencies and common practice. This helped our understanding of how different methodologies might apply to different disciplines.

In ODIN we also explored how different systems, platforms and services can interoperate and feedback to each other. Based on the conceptual framework defined during the first phase of the project, we engaged with different

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stakeholders and generated practical evidence that demonstrated not only that interoperation is desirable, but also that it is feasible.

We built on the roadmap proposed during the first year aimed at our key stakeholders: data centres, researchers, libraries, publishers, libraries, funders and policy makers. Gaps identified in year 01 were revisited and refined.

The project coordination was led by the BL, though the personnel involved changed. The same coordination strategy was maintained through regular phone meetings and by meeting face-to-face as needed. We continued to use the Twiki as the main communication platform. Our non-European partners continued their involvement, taking part in the different phone and face-to-face meetings and contributing considerably to all the deliverables produced.

Main results

Building on the analysis and the workflows proposed for HEP and HSS in the first year we focused our work during the second period in identifying both common practice and practice specific to each discipline. We designed a number of case studies in which we explored implementations and ways of developing internal and third-party added-value services. We identified the fundamental areas requiring attention, including current and future needs, technical requirements, long term sustainability requirements and how best to engage with communities.

We provided tools based on the conceptual model developed during the first period allowing any author with an ORCID ID to claim a DataCite dataset. We mapped the metadata schemas of both services. We created the tools to make ORCID IDs interoperate with ISNI² and ETHOS³. We developed a tool that notifies data centres when an author claims a DOI minted by them. ANDS, our Australian partner, created a tool that enables users to link their data to their own author ID. Based on our SWOT analysis in the first year we produced an updated set of gaps

² <http://www.isni.org>

³ <http://ethos.bl.uk>

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together with the actions taken so far to overcome them. We produced a set of refined recommendations aimed at the different stakeholder groups.

Future Work

We will continue to disseminate the results of ODIN, not only at different conferences where talks are already scheduled, but also through printed materials. We are also planning a number of publications to further communicate the results of the project.

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2. PROJECT OBJECTIVES, WORK PROGRESS AND ACHIEVEMENTS

2.1. Project objectives for the period

The ODIN Project identified four specific objectives, classified under the following headings:

- Access
- Discovery
- Interoperability
- Sustainability

We present details for each of those objectives and the corresponding achievements during the second year of the project.

2.1.1. Access

"Researchers must be able to seamlessly access datasets used in a journal article, a grant report, or another scholarly artefact, with explicit and unambiguous terms of use."⁴

ODIN objective: Build shared understanding

"The project will engage with all ODIN stakeholder communities to understand how gaps in the support for data and contributor identifiers may be bridged, in order to meet the needs of the community for access to research data. Consensus will be built on a road-map to implement the missing identifier layer, and overcome the access challenge. This will be subject to a thorough validation, and fully-supported by all stakeholders, with concrete recommendations feeding into HORIZON2020."⁵

Engagement activities with the main stakeholders continued during the second year of the project, namely: e-infrastructures and data centre operators; scientific

⁴ ODIN Description of Work

⁵ ODIN Description of Work

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and research communities; the scholarly communication community (including publishers and librarians); and funders and policy makers.

We built a shared understanding through public and private conversations, through WP2 and WP3 activities, and interviews in the context of WP5. These allowed us to document the perceptions, attitudes and barriers perceived by each of the mentioned stakeholders.

2.1.2. Discovery

“Researchers must be able to identify scholarly works or datasets related to each other either through networks of references and citation or through shared contributors”⁶

ODIN objective: explore proofs of concept

During the second year ODIN enriched the proofs of concept in HSS and HEP developed during year 1:

- **Humanities and Social Sciences (HSS):** *“where generators, curators and users of multiple datasets are separated by considerable distances in space and/or in time, without any prevailing framework for identification of the data or the different contributors.”*
- **High Energy Physics (HEP):** *“where massively multi-authored publications and their accompanying datasets exist in multiple versions across several repositories, with no mechanism currently in place to aggregate them.”⁷*

We included new case studies for both disciplines and extended the analysis to understand current practices and community needs.

Through the analysis of the different workflows we established common views and issues, and identified particularities for each disciplinary area. The tasks and

⁶ ODIN Description of Work

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claim tools developed by the project made possible the attribution of datasets to contributors, no matter the discipline.

2.1.3. Interoperability

"Users must be able to connect datasets and contributors across independent platforms using different, but interoperable identifier schemes."⁸

ODIN objective: demonstrate interoperability

"ODIN will define concrete interoperability solutions between ORCID and DataCite identifiers so that data in a selected system participating in DataCite can be connected (through DataCite and ORCID) to contributors identified in another system, and vice versa."⁹

Following the Conceptual Model of Interoperability developed during the first period of the project¹⁰ we built tools that allow the connection of DataCite DOIs with ORCID IDs. Even more, we extended interoperability to other research artefacts such as authors with doctoral theses, (i.e. EThOS claim tool) and ORCID IDs with other authors' PID systems (i.e. ISNI).

2.1.4. Sustainability

"Funding agencies and research institutions must be able to depend on the on-going viability of the systems that provide and maintain persistent identifiers. The organisations that deliver those services may be commercial or non-profit, but in either case their sustainability depends on the value of the services they provide."

⁸ ODIN Description of Work

⁹ ODIN Description of Work

¹⁰ D4.1 Conceptual model of interoperability

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ODIN objective: stimulate added-value services

“There are enormous opportunities for the providers of identifiers, and for innovative third parties, to provide value-added services on top of a layer of interoperable data and contributor identifiers.”

Through different activities during the course of the second year (i.e. Codefests, webinars, hands-on sessions, etc.) we engaged with developers in different organizations that built tools on top of both DataCite and ORCID services and other PID platforms.

2.2. Work progress and achievements during the period

2.2.1. WP2 – Communication

Summary of progress towards objectives and details for each task/significant results

The main objective of WP2 is to offer a communication framework within, and beyond, the ODIN Consortium in order to ensure representation of all stakeholder groups in the activities of the project.

During year 2 the team promoted project outputs and activities by synthesising project findings and packaging them for stakeholder groups. The team:

- gave 10 conference presentations and papers;
- wrote five journal articles (three of which have been published and two are in press at the time of writing);
- hosted two webinars;
- published how-to guides and information leaflets; and,
- sponsored a developer challenge and panel discussion at Open repositories 2014.

Information on all of these activities is available on the redesigned project website, and full details are provided in the Final Communications report (D2.4).

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Activities by task

Task 2.2: Communication and dissemination, M1 – M23 (ORCID EU, DataCite, all)

In the first year of the project, the Communication plan was put into place. The project website (www.odin-project.eu) was comprehensively redesigned. ODIN partners have constantly been identifying and communicating with the different communities of interest for the project both online and in person. Table 1 shows some of the events that the ODIN partners participated in. A revised action plan for communication activities in the second year was submitted to the EC in May 2014, describing in detail the focus in year two on reaching specific stakeholder groups with targeted activities.

Task 2.4: Hackathon outreach, M11 – M23 (ORCID EU, all)

The emphasis on direct outreach to developers and implementers of interoperability tools and solutions continued in the second year of ODIN. Outreach activities included a technical webinar on June 3 2014, which was attended by 124 people, and a suite of activities at the Open Repositories Conference, including the sponsorship of the Developer Challenge and a Panel Discussion.

The second year focus on tools and services development resulted in a number of interoperability solutions (which are described in detail in D4.2) including enhanced interoperation between ORCID and DataCite, data imports for the United Kingdom's Electronic Theses Online Service (EThOS), a claim tool linking International Standard Name Identifiers (ISNIs) with ORCID IDs, the implementation of tools developed during the first year ODIN codefest into the Dryad digital repository and an Australian National Data Service tool connecting research data collections to authors using ORCID.

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Task 2.5: Task 2.5: Planning and management of “plebiscite”, M17 – M25 (ORCID EU, BL, all)

As a core part of WP5, the ODIN Roadmap was developed iteratively, via a process of landscape analysis which was fed into community discussions and two series of semi-structured interviews with key stakeholder groups, including publishers, researchers and e-infrastructure providers. As a result, project outputs were both heavily community-driven and of particular interest to stakeholders outside of the project team.

Once the second round of community consultation was complete, the final roadmap was promoted via a coordinated sequence of events. These began with a community webinar, attended by 57 stakeholders with responses to the roadmap by experts from across the field and a panel discussion. Following up on this event, a dedicated policy-led breakout session was a core part of the ODIN Final Event programme, and included responses from thought leaders in the Persistent Identifiers field to the roadmap recommendations.

Task 2.6: Final communication report, M24 – M25 (ORCID EU)

The Final Communication report was submitted to the EC in August 2014, and was updated to include the results of September communications activities (the second ODIN webinar, described under task 2.5 above, and the ODIN Final Event, described under task 2.7 below). The report breaks down activities by broad type and gives a detailed account of both the project team’s communications activities and the evolution of the communication approach. Areas covered include:

- creation and dissemination of derived materials (see task 2.2 above);
- engagement with existing and emerging initiatives (outlining the project’s outreach to 10 significant, related initiatives and participation in additional sub-groups and activities under their aegis);
- conferences and publications, including a full and detailed list of all papers, presentations and articles; and,

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- project events, including the project kick-off and first year events as well as those planned and carried out during year 02.

In addition, the report analyses and sets out evidence for the impact of all communications activities carried out throughout the life of the project in dedicated sub-chapters linked to each type of activity.

Task 2.7: Final event, M25 (BL)

The ODIN Final Event took place on September 24 2014, at the De Meervaart Conference centre in Amsterdam. It was co-located with the 4th Research Data Alliance plenary meeting, which ensured access to an expert, interested and highly motivated audience.

The event was chaired by Dr Laure Haak, Executive Director of ORCID, and featured demonstrations from project partners of the tools and services that have been developed as a result of the project. There were two breakout sessions, designed to enable experts in technical and policy aspects of research data management and PIDs to engage directly with the project team and to explore ODIN's work to enable interoperability of systems and schema, and the opportunities and priorities for implementing the ODIN roadmap.

Additional input was provided by acknowledged experts in the field, including keynote presentations from Dr Merce Crosas, Director of Data Science at IQSS, Harvard University, and Dr Simon Hodson, Executive Director of CODATA.

87 delegates registered to attend the event, and 82 attended. Discussion in the breakout sessions was extremely lively and engaged, and demonstrated the clear community appetite both for improved access to and uptake of PIDs and for immediate access to tools and services to enable them to take advantage of the project outputs.

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Table 1 - ODIN Presentations and Talks at non-ODIN Events

Event title	Date	Partner	Location
Cohort and Longitudinal Studies Enhancement Resource (CLOSER) Leadership Team	29/11/2012	BL	The British Library
BL Scholarship and Collections Open House	24/01/2013	BL	The British Library
BL Social Sciences Blog: 'Identifiers': Creating a network of researchers and research objects	20/10/2012	BL	n/a
Identity Awareness: Toward an Invisible e-Infrastructure for Identifying Data and Authors	28/10/2012	ANDS	Sydney, Australia
3ª Conferencia sobre calidad de revistas de ciencias sociales y humanidades (CRECS 2013)	09/05/2013	DataCite	Sevilla, Spain
FESABID 2013: XIII Jornadas Españolas de Documentación	25/05/2013	DataCite	Toledo, Spain
DataONE User Group	07/07/2012	DRYAD	Chapel Hill, NC, USA
17th International Conference on Theory and Practice of Digital Libraries	22-26/09/2013	CERN	Valetta, Malta
ORCID Outreach Meeting	23/05/2013	ORCID	Oxford, UK
International Association for Social Science Information Services and Technology (IASSIST) 2013	29/05/2013	BL	Cologne, Germany
British Library DataCite Workshop no. 6: Research data metrics for impact and citation	14/06/2013	BL	London, UK

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Association of Librarians in Social Sciences Summer Conference	30/07/2013	BL	London, UK
DataCite summer meeting 2013	19/09/2013	DataCite	Washington DC, USA
DataCite Canada workshop	16/10/2013	DataCite	Ottawa, Canada
Max Planck PubMan Days	24/10/2013	arXiv	Munich, Germany
ORCID integration: A case study from ANDS and international development	22/10/2013	ANDS	Brisbane, Australia
DataCite summer meeting 2013	20/09/2013	ORCID	Washington DC, USA
IDCC	24/02/2014	DRYAD	San Francisco, CA
Citizen Cyberscience Summit 2014	21/02/2013	DataCite	London, UK
ANDS Workshop @Digital Humanities Australasia 2014: Boosting your research profile through your research data	17/03/2014	ANDS	Perth, Australia
CHAIN-REDS Workshop	11/12/2014	DataCite	Tunis, Tunisia
IASSIST 2014	05/06/2014	BL	Toronto, Canada
UK DataCite client meeting	21/07/2014	BL	London, UK
CASRAI and ORCID – Putting the pieces together to collaboratively support the Research Community	13-15/05/2014	ORCID	Rome, Italy
Connecting you, your PhD and your published research: an ORCID ETHOS linking solution	23-25/07/2014	BL	Leicester, UK
DataCite and ORCID: Towards Holistic Open Research	25-26/08/2014	DataCite	Nancy, France
A comparative analysis of the HSS & HEP data submission workflows within the ODIN project.	08-12/09/2014	CERN	Amsterdam, Netherlands

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Use of resources (including actual vs. planned)

Tables 2a and 2b: WP2 person-months per partner compared with the DoW.

No.	Short name	PM expected to be spent during P02	PM spent in WP2
1	ANDS	0.0	0.0
2	arXiv	0.0	0.0
3	BL	0.5	0.5
4	CERN	1.6	5.5
5	DataCite	2.2	2.4
6	DRYAD	0.0	0.0
7	ORCID	7.0	6.2
TOTAL		11.4	14.6

No.	Short name	PM expected to be spent during the whole duration of the project	PM spent in WP2
1	ANDS	0.0	0.0
2	arXiv	0.0	0.0
3	BL	1.0	1.4
4	CERN	3.0	10.7
5	DataCite	4.0	2.9
6	DRYAD	0.0	0.0
7	ORCID	13.0	12.1
TOTAL		21.0	27.1

Deviations from DoW/ impact on other tasks

Following recommendations from the first-year review for a more vigorous community engagement, CERN provided additional resources, beyond the project funding envelope, to support such activities as preparation and execution of webinars, code challenges, workshops and participation to conferences.

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2.2.2. WP3 – Proofs of Concept

Summary of progress towards objectives and details for each task/significant results

The main objective of WP3 has been to develop two disciplinary proofs of the concept of open and interoperable persistent identifiers of data and contributors in scholarly communication, in a variety of current and future scenarios. In the first year these proofs of concept were established; the focus of the second year has been to identify common issues in open and interoperable persistent identifiers of data and contributors by establishing a common cross-disciplinary view on the relevant workflows.

This cross-disciplinary view on workflows was developed into a generic workflow for the integration of identifiers that can be tested across domains. We have begun testing with the development of concrete workflows at the MRC National Survey for Health and Development and implementation within CERN's INSPIRE digital library. The generic workflow has also been validated against existing practice at other example of humanities and social sciences archives that have already implemented identifiers.

Commonalities and the generic workflow are expressed and explored in Deliverable 3.3, with remaining challenges for HSS and HEP teased out.

Activities by task

Task 3.2 HSS. M2 – M23 (BL), Second phase M13-M23

Based on the results of D3.1 and D3.2, a generic workflow was developed that highlighted the intervention points for DataCite DOIs and ORCID identifiers. This generic workflow was presented to the MRC National Survey of Health and Development (MRC NSHD), who are in the process of implementing a concrete workflow for the integration of persistent identifiers.

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Feedback was also gained from GESIS (DataCite members) and from the UK Archaeological Data Service (ADS - DataCite users) to confirm the generic workflow reflects the way in which data is managed and identifiers applied across the research landscape. In June 2014, Amir Aryani from ANDS worked at the British Library to input expertise for D3.3 as well as for WP4.

Task 3.3 HEP M3 – M23 (CERN, DataCite), Second phase M13-M23

CERN continued to collaborate closely with the HEP community to identify best practice in sharing and managing research data.

Task 3.5 Commonalities: Towards a common view across disciplines M13 – M17 (BL, CERN, DataCite)

Comparisons for the HSS and HEP proofs of concept highlighted the commonalities between the discipline archives in terms of managing data and integrating identifiers.

Task 3.6 Final report M23 – M24 (BL, CERN, DataCite)

The commonalities across the two proofs of concept were drawn out in D3.3, leading not only to the development of a generic workflow, but validation of that workflow in wider contexts. The conclusions from this work were drawn into work packages 4 and 5.

Use of resources (including actual vs. planned)

Tables 3a and 3b: WP3 person-months per partner compared with the DoW.

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No.	Short name	PM expected to be spent during P02	PM spent in WP3
1	ANDS	0.0	0.0
2	arXiv	0.0	0.0
3	BL	4.3	4.6
4	CERN	4.3	32.3
5	DataCite	2.2	0.2
6	DRYAD	0.0	0.0
7	ORCID	0.0	0.0
TOTAL		10.8	37.1

No.	Short name	PM expected to be spent during the whole duration of the project	PM spent in WP3
1	ANDS	0.0	0.0
2	arXiv	0.0	0.0
3	BL	8.0	20.9
4	CERN	8.0	53.4
5	DataCite	4.0	0.4
6	DRYAD	0.0	0.0
7	ORCID	0.0	0.0
TOTAL		20.0	74.7

Deviations from DoW/ impact on other tasks

For BL additional time was devoted to developing the EThOS tool and the discussions with MRC NSHD were lengthy given the starting point of the study.

CERN has a strategic interest in implementing persistent identifiers (PID) in its digital library and community services. Enabling data citation through PID usage, as outlined by the Force 11 principles, is a strategic goal. Furthermore, PIDs are demanded by community members to enrich the content on platforms like INSPIREHEP or Zenodo. INSPIREHEP is a large scale e-infrastructure platform actively used by the HEP community every day, so user-facing services must be

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deployed with enormous care. Also, tailored communication and community engagement activities must be prepared accordingly.

These are the reasons that CERN invested their own resources in addition to the foreseen effort in WP3. They went into the specification of the services, e.g. usability testing, communication tasks and text mining challenges to enable data citation tracking. The result of the overall effort is remarkable as CERN was the first institution to enable the complete modern research data lifecycle, including data submission, data discovery, data reuse and data citation. The latter resulted in the first tracking of data reuse and citation on a community digital library or aggregator. It is CERN's goal to foster such practices and train the community further in terms of reuse and data citation standards.

2.2.3. WP4 – Interoperability

Summary of progress towards objectives and details for each task/significant results

The main objective of WP4 was to prove the value of achieving interoperability between open identifiers for data and contributors in different infrastructures.

After the work carried out by ORCID and DataCite in the first year of the project, all the rest of the partners contributed extensively in the work carried out during the second period. We not only demonstrated that interoperability between different PID platforms is possible, but also highly desirable. In the context of this WP and during the second period of the project, we developed tools to link data PIDs (DOIs) to researchers PIDs (ORCID IDs). We also made different author PIDs interoperate between them (ORCID IDs with ISNI IDs) or other research artefacts such as doctoral theses (ETHOS) with author PIDs (ORCID IDs).

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Activities by task

Task 4.5 Proof of Concept M13 – M23 (DataCite, ORCID EU)

Building on the Conceptual Model of Interoperability developed during the first year, we implemented different tools to provide interoperability between different platforms. These were actually implemented in DRYAD and ANDS datacentres, both ODIN partners.

Task 4.6 Final report M23 – M24 (DataCite, ORCID EU, all)

In the final report we summarize the conceptual model and present the workflow of interoperability. We present tools to achieve this interoperability and demonstrate implementation in different use cases. We also harmonized the DataCite and ORCID metadata schemas in order to provide guidance and orientation for future attempts to make PIDs interoperate.

Use of resources (including actual vs. planned)

Tables 4a and 4b: WP4 person-months per partner compared with the DoW.

No.	Short name	PM expected to be spent during P02	PM spent in WP4
1	ANDS	0.0	0.0
2	arXiv	0.0	0.0
3	BL	1.6	3.7
4	CERN	0.5	0.0
5	DataCite	6.5	10.2
6	DRYAD	0.0	0.0
7	ORCID	4.9	2.7
TOTAL		13.5	16.7

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No.	Short name	PM expected to be spent during the whole duration of the project	PM spent in WP4
1	ANDS	0.0	0.0
2	arXiv	0.0	0.0
3	BL	3.0	7.4
4	CERN	1.0	0.0
5	DataCite	12.0	16.9
6	DRYAD	0.0	0.0
7	ORCID	9.0	7.3
TOTAL		25.0	31.6

Deviations from DoW/ impact on other tasks

DataCite engaged with a wider range of authors than anticipated to produce the report.

ORCID participation in WP4 was constrained by staff changes; additionally effort was diverted to WP2.

2.2.4. WP5 – Strategy

Summary of progress towards objectives and details for each task/significant results

The main objective of this work package is to enable the implementation of the 'missing thin layer' of interoperable, open, persistent identifiers in the architecture of the Collaborative Data Infrastructure proposed by HLEG in 2010¹¹.

After the WP5 work during the first year to identify the gaps that hinder implementation of the 'thin layer', work carried out during the second period included events, desk research and interviews to refine our understanding of those gaps and provide an update on progress towards filling them so far.

¹¹ <http://cordis.europa.eu/fp7/ict/e-infrastructure/docs/hlg-sdi-report.pdf>

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Activities by task

Task 5.4 Incorporate validated proofs and interoperability M15 – M18 (BL, CERN)

Feeding from the different reports in P01 we revised the proposed roadmap and further analysed scenarios where it could be implemented.

Task 5.5 Development and presentation of final draft roadmap and recommendations M19 – 23 (CERN,BL, all)

We defined a set of recommendations aimed at the different stakeholder communities identified presented in a series of one-pagers with concrete recommendations.

Task 5.6 Final recommendations M23 - M24 (CERN)

The final roadmap was presented to a DIGOIDUNA representative who will present their impression in D1.5 (Second Year Report). The international partners, as a component of WP6, will also comment on it in D6.2.

Use of resources (including actual vs. planned)

Tables 5a and 5b: WP5 person-months per partner compared with the DoW.

No.	Short name	PM expected to be spent during P02	PM spent in WP5
1	ANDS	0.0	0.0
2	arXiv	0.0	0.0
3	BL	1.1	0.1
4	CERN	6.0	9.3
5	DataCite	0.5	0.0
6	DRYAD	0.0	0.0
7	ORCID	0.5	1.3
TOTAL		8.1	10.7

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No.	Short name	PM expected to be spent during the whole duration of the project	PM spent in WP5
1	ANDS	0.0	0.0
2	arXiv	0.0	0.0
3	BL	2.0	0.2
4	CERN	11.0	16.2
5	DataCite	1.0	0.0
6	DRYAD	0.0	0.0
7	ORCID	1.0	1.3
TOTAL		15.0	17.7

Deviations from DoW/ impact on other tasks

CERN leveraged additional resources, beyond the project funding envelope, to perform more in-depth work than expected in the definition of the gaps and the recommendations.

WP6 – Internationalisation

Summary of progress towards objectives and details for each task/significant results

The international partners confirmed that the interoperability approach taken in ODIN aligned with other international activities in this area. As a result of ODIN, they initiated a number of activities which moved towards building a layer of interoperability between identifiers. The scope of these activities highlighted the importance and versatility of the ODIN interoperability model, and suggested that the presented proof of concept projects could be further developed to benefit an extended community.

Activities by task

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Task 6.4 Agile validation in the second year M13-M23 (ANDS, all)

WP6 partners kept regular contact with the rest of the consortium via electronic communications and fortnightly project team conference calls. In addition, there were visits by WP6 participants to European partners during the second year.

During June 2014 Simeon Warner from arXiv visited CERN and Amir Ariani from ANDS visited the British Library. Todd Vision from Dryad also visited the British Library and CERN in the same month. Simeon and Amir joined other ODIN partners in Helsinki, where they took part in the Open Repositories conference.

Following the collaboration with ODIN partners on the interoperability model, ANDS has continued to implement the ORCID and DataCite DOIs integration in their system.

Task 6.5 Review of final materials M23-M24 (ANDS, all)

The WP6 partners reviewed all the scientific reports due in the second period.

Use of resources (including actual vs. planned)

Tables 6a and 6b: WP6 person-months per partner compared with the DoW.

No.	Short name	PM expected to be spent during P02	PM spent in WP6
1	ANDS	2.2	3.8
2	arXiv	1.1	1.4
3	BL	0.0	0.0
4	CERN	0.0	0.0
5	DataCite	0.0	0.0
6	DRYAD	1.1	1.7
7	ORCID	0.0	0.1
TOTAL		4.3	6.9

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No.	Short name	PM expected to be spent during the whole duration of the project	PM spent in WP6
1	ANDS	4.0	7.7
2	arXiv	2.0	2.2
3	BL	0.0	0.0
4	CERN	0.0	0.0
5	DataCite	0.0	0.0
6	DRYAD	2.0	2.8
7	ORCID	0.0	0.1
TOTAL		8.0	12.8

Deviations from DoW/ impact on other tasks

ANDS and DRYAD contributed not only to the WP6 report, but also to other WPs reports. They also participated in the production of papers and delivered presentations in their respective home countries.

Project management during the period

The main tasks of WP1 (Project Coordination) and their achievements are summarized below.

Task 1.1: Administrative and Financial co-ordination, M1 - M24 (BL)

The coordinator continued to manage the administrative and financial aspects of the project; monitored the progress of tasks and kept the risk register updated. The second instalment was received and distributed.

Task 1.4: Risk register, M1 – M24 (BL, DATACITE, CERN, ANDS)

The risk register was updated and monitored.

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Task 1.5: Consortium management, M1 – M24 (BL, DataCite)

There was regular communication between the Consortium Members via email and fortnightly telephone calls. We organized regular face-to-face meetings with the participation of international partners when possible. Effort was recorded for each partner and work package on a monthly basis through the project wiki. We used templates for deliverables and other reports to ensure compliance with the project quality plan.

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Use of resources (including actual vs. planned)

Table 7a and 7b: WP1 person-months per partner compared with the DoW.

No.	Short name	PM expected to be spent during P02	PM spent in WP1
1	ANDS	0.0	0.0
2	arXiv	0.0	0.0
3	BL	5.4	6.8
4	CERN	0.5	0.1
5	DataCite	1.6	4.9
6	DRYAD	0.0	0.0
7	ORCID	0.5	1.2
TOTAL		8.1	13.0

No.	Short name	PM expected to be spent during the whole duration of the project	PM spent in WP1
1	ANDS	0.0	0.0
2	arXiv	0.0	0.0
3	BL	10.0	16.7
4	CERN	1.0	0.3
5	DataCite	3.0	7.9
6	DRYAD	0.0	0.0
7	ORCID	1.0	1.1
TOTAL		15.0	26.0

Deviations from DoW/ impact on other tasks

BL invested more resources than initially expected on the project coordination. DataCite supported the BL on the coordination and took care of scientific coordination as well.

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Project Meetings

Telephone meetings were held on a fortnightly basis throughout the second year. Due to challenges faced by the global nature of the partners these alternate between Morning in Europe to facilitate Australian participation and Afternoon in Europe to facilitate US partners' participation.

Four face to face meetings were held within the second year to monitor the status of the project, review plans for completing tasks, milestones and deliverables, to plan for future work and to produce publications.

Table 8: face to face meetings.

Date	Venue	Purpose
15 - 18 Oct 2013	Geneva	First year event and Codesprint
22 Jan 2014	London	WP2, WP3 and WP4 meeting
05 Jun 2014	London	Deliverables meeting
24 – 25 Sep 2014	Amsterdam	Final event and final review

Project planning and status

The status of the project is satisfactory. All scientific deliverables for the second year but one (D6.2) were submitted by M24. Actions for tasks, activities and deliverables for all work packages during the second year were accomplished.

Impact of possible deviations for the planned milestones and deliverables

In order to minimize travel costs and attendance to the Final Event the EC agreed to extend the project by one month. This measure has had little effect in the production of scientific deliverables.

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Development of the Project Website

The project website is operational and up to date at <http://odin-project.eu/> . It will be updated once the project is over.

2.3. Deliverables and milestones tables

2.3.1. Table of Deliverables

TABLE 1. DELIVERABLES										
Del. no.	Deliverable name	Version	WP no.	Lead beneficiary	Nature	Dissemination level ¹²	Delivery date from Annex I (proj month)	Actual / Forecast delivery date Dd/mm/yyyy	Status No submitted/ Submitted	Comments

¹² **PU** = Public

PP = Restricted to other programme participants (including the Commission Services).

RE = Restricted to a group specified by the consortium (including the Commission Services).

CO = Confidential, only for members of the consortium (including the Commission Services).

Make sure that you are using the correct following label when your project has classified deliverables.

EU restricted = Classified with the mention of the classification level restricted "EU Restricted"

EU confidential = Classified with the mention of the classification level confidential " EU Confidential "

EU secret = Classified with the mention of the classification level secret "EU Secret "

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D2.4	Final communication report including results from final event	1.0	2	ORCID	R	PU	Aug 2014	Sep 2014	Submitted	Updated version including results from the Final Event submitted to the EC in September 2014.
D3.3	Proof of concepts commonality	1.0	3	BL	R	PU	Aug 2014	Aug 2014	Submitted	
D4.2	Workflow for interoperability	1.0	4	DataCite	R	PU	Aug 2014	Aug 2014	Submitted	
D5.2	Final roadmap and recommendations for the missing thin layer of the e-Infrastructure	1.0	5	CERN	R	PU	Aug 2014	Aug 2014	Submitted	

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D6.2	International review of final outputs		6	ANDS	R	PU	Aug 2014	Sep 2014	Submitted	
D1.5	Second Year Report	0.9	1	BL	R	PU	Nov 2014	Nov 2014	Submitted	
D1.6	Final Report	0.9	1	BL	R	PU	Nov 2014	Nov 2014	Submitted	

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2.3.2. Table of Milestones

TABLE 2. MILESTONES							
Milestone no.	Milestone name	Work package no	Lead beneficiary	Delivery date from Annex I dd/mm/yyyy	Achieved Yes/No	Actual / Forecast achievement date dd/mm/yyyy	Comments
MS4	Final event	WP2	ORCID	24/09/2014	No	24/09/2014	
MS5	Commonalities identified	WP3	BL	01/02/2014	Yes	01/02/2014	
MS6	Proofs validate workflow	WP4	DataCite	03/01/2014	Yes	03/01/2014	

ANNEX I. ODIN SECOND YEAR DELIVERABLES (D4.2; D5.2; D3.3): DIGOIDUNA REVIEW

Following the approach adopted in the first evaluation round, our review of the ODIN second year activities and results uses the final recommendations of the DIGOIDUNA study as a framework 1) to evaluate the ODIN progresses and outcomes, 2) to verify the compliance of the project focus with the initial set of suggestions we provided and 3) to suggest possible directives for future development based on current project advancements.

We first report the DIGOIDUNA recommendations and the suggested actions extracted from the first-year evaluation. A new set of considerations and suggestions distilled from our second analysis of the ODIN results follow.

DIGOIDUNA recommendation 1: Define the DIs agenda:

1. Defining the common objectives and organize them into a list of workable temporal priorities.
2. Agreeing on a shared governance model, which defines devolved responsibilities amongst stakeholders and ensures long-term sustainability.
3. Sharing a conceptual framework in which the basic technical parameters and the fundamental services are introduced and described.
4. Planning interventions to promote awareness, dissemination and education activities aiming at expanding and reinforcing DI knowledge and skills.

SUGGESTED ACTIONS from the first evaluation round:

1. It is important that the ODIN roadmap organizes **common objectives** into a list of workable **temporal priorities**.
2. **Key stakeholders** should be involved in the definition of a **shared governance model** defining responsibilities among stakeholders to ensure long-term sustainability of the interoperability layer.

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DIGOIDUNA recommendation 2: Bootstrapping DIs in SDIs

1. Reinforce, promote and secure EU wide institutional coordination among vertical and regional clusters of e-infrastructure stakeholders (common policies on the governance of identifiers for digital objects and authors).
2. Funding bodies must provide initial support to seed initiatives, which aim at implementing the coordination model defined in the agenda and at creating a critical mass of coordinated DI systems.
3. Promote awareness and skills development to enable different stakeholders to participate effectively on DI initiatives and infrastructures.
4. Work towards systematic implementation of technical and organisational factors that underpin trust in identifiers, their reliability as a key component of SDIs - secure their operational management.

SUGGESTED ACTIONS from the first evaluation round:

1. In order to promote the convergence toward an integrated solution, ODIN should exploit **institutional coordination** and EC policy instruments, which should contribute to drive demand and foster trust around the PID infrastructure.
2. Another aspect, which should be taken into account by the ODIN project is to identifying **funding schemes** which are flexible enough to allow the reallocation of funds in the portfolio based on emerging requirements and needs.

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DIGOIDUNA recommendation 3: Mobilizing resources

1. Funding agencies should design funding schemes, which may attract new public and private investments and efforts in developing and adopting DI-based added value services and solutions.
2. Stakeholders, and especially funding agencies, should foster interoperability based on consolidation of established DI systems (where possible) more than on proliferation of ad hoc systems.
3. Actions should be taken to mobilize consolidated technical skills to implement effective digital identifiers infrastructures within SDIs and adopt measures to assess the quality and impact of them for the exploitation of e-Science results.
4. Funding agencies should design funding schemes, which may attract new public and private investments and efforts in developing and adopting DI-based added value services and solutions.

SUGGESTED ACTIONS from the first evaluation round:

1. As mentioned above, the institutional support is recognized by DIGOIDUNA as an essential aspect for the success of the infrastructure. Based on this idea, ODIN should exploit the DIGOIDUNA recommendation of rising **institutional consensus** around the issue of interoperability between data and contributors, and make funding initiatives in this context a priority in the political agenda at national and international level.
2. The DIGOIDUNA guidelines suggest that actions should be taken to **mobilize financial resources** aiming at triggering a wider demand of usage of the

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proposed solution. Following this recommendation, ODIN should incentive funding schemes, which may attract investments from private and public sectors in order to diversify the sustainability of the initiative.

- 3. Training and education** are crucial aspects in the DIGOIDUNA recommendations to favour the mobilization of human resources. In line with this trajectory, ODIN should promote innovation in scholarship models and planning interventions to promote education activities aiming at expanding and reinforcing knowledge and skills.

DIGOIDUNA recommendation 4: Sustainable solutions

1. Stakeholders need to develop business models where the costs of developing and sustaining identifier infrastructures and the responsibility in granting the long term sustainability of these infrastructures are distributed among the beneficiaries.
2. The flexibility of funding sources should be enhanced, allowing the reallocation of funds in the portfolio to enable the rapid scaling of promising solutions that embed or promote the value (usage) of identifiers.
3. Funding bodies must support the development of collaborative models and actions to create synergies and exchange opportunities between the private/commercial sector and the scientific sector
4. Stakeholders need to develop business models where the costs of developing and sustaining identifier infrastructures and the responsibility in granting the long term sustainability of these infrastructures are distributed among the beneficiaries.

SUGGESTED ACTIONS from the first evaluation round:

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1. Based on the DIGOIDUNA results, **flexible business and sustainability models** should be included within the overall framework proposed by ODIN in order to facilitate the rapid reallocation of financial resources and the scaling of the proposed solutions and services.

2. **Stakeholder participation** is largely promoted by ODIN and it should be extended (according the DIGOIDUNA approach) to the definition of **sustainability plans** in order to distribute the responsibility in ensuring the long-term sustainability of the infrastructure among the beneficiaries.

3. The **cross-fertilization** and knowledge-sharing **between academia and industry** is another DIGOIDUNA recommendation which should be exploited by ODIN as a big opportunity to increase the potential of innovation in terms of ROI and create new synergies and opportunities between the private/commercial sector and the scientific sector.

- In the second year of the project a substantial progress has been done in the definition of a common roadmap (D5.2) among key stakeholders toward the implementation of an interoperable PID infrastructure. The initial set of gaps and related actions has been refined in several ways:
 - Collecting requirements and challenges from interviewed stakeholders with cross-disciplinary experiences and from different nations.
 - Gathering feedback from experts and users on the proposed approach during conferences and events.
 - Exploiting the results of project activities facing with challenges and disciplinary differences during the development and implementation of the proofs of concept and tools.
 - Investigating recent PID developments and implementations in different disciplinary fields (including physics, geoscience, health and

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biomedicine research and higher education) and interdisciplinary solutions and developments as well.

The adopted approach, which looks at the needs and challenges of specific communities to develop a common solution with tailored services on top of it is fully in line with the DIGOIDUNA recommendations.

Moreover, in the same spirit of multi-stakeholder participation, the list of recommendations focuses on supporting the access and integration of communities with different levels of data production and different levels of awareness/experience with PIDs. Among the proposed actions, three are specifically devoted to raise awareness and create incentives to encourage stakeholders to use interoperable PID infrastructures and related value-added services. This can be realized by defining common policies for data sharing and re-use, implementing cross-platform services addressing the needs of different stakeholders and providing training activities to broader the adoption of PID infrastructures and services. All these actions reflect the DIs agenda described in the DIGOIDUNA study.

- The prioritization of the actions has not been addressed so far but the analysis of the progress done to close the different gaps gives an idea of planning and temporal progression in reaching the objectives.
- The aspect of shared governance to ensure sustainability is not properly reflected in the gap analysis and recommendations. Providing funding (at national or EU level for example) cannot be the answer for this issue in the long term. According to the DIGOIDUNA study, to ensure the long-term sustainability of the PID interoperability layer it is necessary to involve key stakeholders and players (including private and public sectors) in the

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governance of the infrastructure itself to distribute the costs of its development and the responsibility in granting the long term sustainability among the beneficiaries. The invoked sustainability of services and tools (recommendation 9) depends also and firstly from the sustainability of the thin layer of interoperability on which these services are built. This aspect should be highlighted and a specific action should be dedicated to it.

RESPONSE FROM ODIN: Both DataCite and ORCID include a range of key stakeholders from the public and private sector in their governance bodies, all of whom are signed up to the principle of interoperability. We will make sure we emphasize this particular aspect when disseminating ODIN results.

- Another gap, which is not mentioned in the D5.2 deliverable is the interoperability between PIDs and Cool URIs. Since bibliographic and scholarly information is increasingly available as LOD on the Web, the integration of the LOD produced by authoritative institutions with those produced by the general Web community represents a crucial use case for a PI interoperability infrastructure. This conforms with the idea of trusted identifiers on Web of data described in D4.1 but it is not further explored at the level of (conceptual) model and services.

RESPONSE FROM ODIN: It is an interesting observation. However given the duration, the scope and the expertise within the project these issues were excluded.

- About the interview methodology, even though the goal was to refine the gap analysis developed in the first year, the fact that interviewees received in advance the briefing document including the findings of the first year WP5

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gap analysis may have biased the answers and reduced the number of gaps listed (due to the well-known confirmation bias phenomenon).

- Another important advance has been done in the finalization of the conceptual framework (in particular at the level of metadata harmonization) and in describing the value of it through the definition of case studies and integration in real-life research systems (D4.2). The model is presented as open, discipline-neutral and inclusive. However, the implementation of it is based on the prioritization of interoperability between two PID systems (i.e. ORCID and DOI). It is difficult to understand if and how the model can be extended to include other identifier solutions (event though this goal is mentioned here and there in the deliverables), including local and tailored PID systems, which are currently largely diffused in the reference communities (as mentioned in the gap analysis). The actions proposed in D5.2 seem to suggest that these communities should be supported to engage with interoperable systems instead of using the interoperability infrastructure to interoperate their local solutions with other “trusted” systems. On the other hand, ORCID is presented as a hub linking existing identifiers with the goal of connecting researchers to their contributions. Within ORCID the DOI-ORCID links (and related metadata) produced by the ORCID/DataCite claim tool are persistently maintained and so the metadata extracted through the EThOS import service and ISNI claim tool. The emerging impression is that ORCID is de facto the interoperability infrastructure, while it is not clear if the data centres can work as identifier hubs themselves by connecting alternative identifiers for the same dataset and linking it to other relevant entities through alternative identifiers. In addition while ORCID cross links with other author identifiers (e.g. ISNI), enabling multiple PIDs to be attached to an ORCID profile, the same potential seems not exploited in the interoperability framework for DataCite and DOI toward other data identifiers like URN and ARK.

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However, in D4.2 the ODIN conceptual model is presented as consisting of three layers: the trusted identifier layer, the data citation virtuous circle and the common data services e-infrastructures. We identify the lack of a technical layer which should implement the interoperability infrastructure at the level of identifier, as supposed above for ORCID.

Once the identifiers eligible for the interoperability layer are defined according to certain criteria, the cross-linkage of different PIDs for the same entity (and related entities) should be managed by a technical infrastructure. In the ODIN approach the interoperability between identifiers is presented as uniquely managed through the virtuous circle of interactions among existing PID infrastructures based on interoperable harmonized metadata schemas. But, as mentioned above, a technical interoperability infrastructure should be envisioned to manage the links among identifiers for the same entity and related entities (e.g. author and his publications). If ORCID can implement this function for author identifiers and related entities, identifiers for other kinds of entities (e.g. datasets, organizations, funding, events) should be managed in the same way. This aspect needs further investigation to be integrated in the current model.

RESPONSE FROM ODIN: we made some steps towards the functionalities described. Further investigation as suggested is properly the subject of a different project.

- A central part of the ODIN conceptual framework is the idea of harmonization of metadata schemas to enhance interoperation (through metadata exchange) between trusted identifier systems. In D4.2 the harmonization workflow is explained and applied to ORCID and DOI, which are qualified as trusted identifiers for authors and data respectively according to the model criteria. Finally, to explore the benefits of the PID interoperation thorough metadata

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harmonization, example tools have been developed based on the metadata workflow.

The results seem promising but some challenges remain to be addressed and resolved. For example the harmonization of metadata schemas can be quite easily managed (at least for the purposes of identifier interoperability) when only two models are in play and few properties are considered, as in the cases analysed in ODIN. The complexity of the harmonization and mapping process increases dramatically when more vocabularies and schemas need to be mapped for supporting semantic interoperability between systems. Since more PID systems need to be included into an open global interoperability infrastructure, this issue cannot be neglected and a point-to-point mapping solution could be ineffective in this case.

RESPONSE FROM ODIN: Noted. It's probably worth adding that the key purpose of ODIN was to identify the feasibility of the interoperability from a conceptual point of view. ODIN did also involve real-life testing, so at least it proved the viability of the conceptual model.

- In D4.2 a clear distinction is made between author identity systems and profile management tools. The distinction is important since suggests the striking difference between content management and identity management. However, the PID infrastructures participating in the interoperability layer seem not uniquely address the identity management function. For example, ORCID collects information about the identified authors which includes metadata about his research output. This information is not used to identify the author and distinguish him/her from the other authors registered in the system. In this sense ORCID is not a pure identity management system since it works as a knowledge base about the identified entities.

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RESPONSE FROM ODIN: Noted.

- The previous point leads us to introduce a consideration about scalability. The proposed solution is based on a PID-to-PID integration approach and it seems to work well since only two systems are coordinated through the interoperability model and in use cases with a limited amount of exchanged data. Scalability issues may emerge when more identifier systems will be integrated through the infrastructure.

To serve the current data-intensive e-science infrastructures, the interoperability layer should be able to cope with a growing number of PIDs from any number of PIDs infrastructures and serve a huge number of interoperability requests. Affording these data intensive flows is a requirement, which should be addressed by the interoperability layer and the current infrastructures could be tested for that.

RESPONSE FROM ODIN: Noted.

- The interviews with stakeholders and consequently the recommendations formulated by ODIN recognize the importance of bootstrapping initiatives to provide financial and political support to the implementation and adoption of PID infrastructures. The implementation of national licenses and memberships for PID systems are an example of such a kind of support at national level. It should be noted that since the proposed interoperability infrastructure is based on a PID system depending on membership fees (i.e. DOI), the lack of funding could hinder even more the access and participation of small scale organizations or developing countries. This aspect is highlighted in the gap analysis but the DOI-based infrastructure could represent a weakness of the proposed approach on this respect. As suggested in action 2 of the previous

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evaluation, we believe that more effort should be dedicated to the definition of funding schemes and business models to prevent the barriers of access due to lack of funding.

RESPONSE FROM ODIN: Noted.

- We have already pointed out the aspect of financial sustainability of the infrastructure and the need of a shared governance to support it in the long term, by distributing the costs for maintaining the infrastructure among a number of participating organizations.

A correlated aspect concerns the architecture of the infrastructure. The ODIN interoperability layer is not a distributed infrastructure but it is build on two existing PID infrastructures (ORCID and DataCite) which may discontinue their service due to financial or other issues. This can have an impact on trust put by users on the infrastructure and its services, since the existence of single points of failure may be recognized as threats to the persistence of the infrastructure.

A different level of sustainability concerns services and tools enabled by the infrastructure which can be implemented and maintained by third party organizations. These services can be sustained by different business models and represent one of the most important incentives for specific communities to use the layer of interoperability and integrating their local systems.

RESPONSE FROM ODIN: Noted.

- The two proofs of concept presented in D3.2 and D3.3 represent an important step to understand the differences and challenges in different communities and start to identify tailored services starting from common processes for

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managing data and identifiers. The proofs of concept are also valuable efforts to encourage communities with very different data management needs and research data practises to systematically integrate PIDs for people and data within their repositories and benefit from the workflow interoperability with other systems. According to the DIGOIDUNA perspective, this effort along with the development of demonstrative tools (as those presented in D 4.2) is a fundamental action since the adoption of PIDs is still scarce due to the low level of awareness within many stakeholder groups about the benefits of adopting PIs for the creation of value-added services on top of scientific data and content.

To increase the level of awareness among stakeholders it is of paramount importance to integrate the interoperability services into the systems already in use by them. ODIN has started to work in this direction. The EThOS import service is a good example of this approach. More activities should be devoted in future to involve industrial and commercial players in the development of services to build new business models, which could contribute to the persistence and sustainability of the interoperability infrastructure.

RESPONSE FROM ODIN: Noted.

- Since the ODIN solution is ultimately based on the interoperation between ORCID and DOI, enlarging the adoption of these systems should be one of the goal to be reached. Several initiatives are reported in D5.2 to prove this effort both on the ORCID and on the DataCite side. These initiatives address the DIGOIDUNA recommendations to foster interoperability based on consolidation of established PDI systems (where possible) more than on proliferation of ad hoc systems. However, a comparison of the current numbers of other PIDs for authors and datasets should be included in the report to give an idea of the relative diffusion of these systems.

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RESPONSE FROM ODIN: We indeed believe that a comparison of the size of the different PIDs systems studied would be extremely interesting. We invested some effort in collecting that information. However, due to a number of reasons (they are commercial solutions, are discontinued, etc.) we could not gather reliable data.