

CIP Competitiveness and Innovation Framework Programme
CIP-Pilot Actions, 2007-2013
CIP-ICT-PSP-2012-6

Project **CIP-Pilot 325101 / OpenScienceLink**
Deliverable **D8.1**
Distribution **Public**



OPENSOURCELINK
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<http://opensciencelink.eu>

OpenScienceLink Evaluation Framework

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Status: Final (Version 1.2)

March 2014

Project

Project ref.no.	CIP-Pilot 325101
Project acronym	OpenScienceLink
Project full title	Open Semantically-enabled, Social-aware Access to Scientific Data
Project site	http://opensciencelink.eu
Project start	February 2013
Project duration	3 years
EC Project Officer	David Guedj

Deliverable

Deliverable type	Report
Distribution level	Public
Deliverable Number	D8.1
Deliverable title	OpenScienceLink Evaluation Framework
Contractual date of delivery	M12 (January 2014)
Actual date of delivery	March 2014
Relevant Task(s)	WP8/Tasks 8.1, 8.2, 8.3
Partner Responsible	TUD
Other contributors	NTUA, LUHS, NKUA, KU Leuven, CNR, Procon, TI
Number of pages	34
Authors	George Tsatsaronis, Daniel Eisinger, Alina Petrova, Michael Schroeder, Yixin Zhang, Christian Pilarsky, Todor Tagarev, Petya Tagareva, Costas Pantos, Iordanis Mourouzis, Vassiliki Andronikou, Efstathios Karanastasis, Adomas Bunevicius, Giorgio Iervasi, Sara Hugelier, Matthias Zschunke
Status & version	Final (Version 1.2)
Keywords	Evaluation Framework, Project's Results, Methodologies, Tools, Key Performance Indicators (KPIs), Metrics

Executive Summary

The current deliverable presents Key Performance Indicators (KPIs), related measures and methodologies to analyze the most critical aspect of the project; its overall performance and evaluation of its outcomes. We have compiled a list of 83 KPIs that focus on the three subjects of the evaluation process, namely the OpenScienceLink project, the developed platform and the five pilots and their operations. Evaluation will be both internal and external; besides the aspects that can be evaluated automatically using internal processes, such as calculations of well defined measures that pertain to the technical aspects of the platform, the evaluation is also based on external feedback by the final consumers of the pilot services and the engaged stakeholders. This latter process will take place via the usage of 7 planned questionnaires to be distributed annually for the evaluation of the three entities on a *per annum* basis. In addition to that, interviews with stakeholders are foreseen to receive feedback for the *mission critical* and *internal business processes* perspectives. As a result, the current deliverable is structured following the aforementioned rationale, presenting analytically the details of the measures, the methods and the objectives of the overall project evaluation.

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1 Introduction

1.1 Project Objectives and Expected Results

It is the overall goal of OpenScienceLink to introduce and pilot a holistic approach to the publication, sharing, linking, review and evaluation of research results, based on the open access to scientific information. OpenScienceLink is intended to reach this goal by piloting a range of novel services that could alleviate the lack of structured data journals and associated data models, the weaknesses of the review process, the poor linking of scientific information, as well as the limitations of current research evaluation metrics and indicators. Five pilot services are being piloted in particular:

- (a) Data journals development based on semantically-enabled research dynamics detection,
- (b) A novel open, semantically-assisted peer review process,
- (c) Services for detection and analysis of research trends,
- (d) Services for dynamic researchers' collaboration suggestions based on non-declared, semantically-inferred relationships, and
- (e) A set of scientific field-aware, productivity- and impact-oriented enhanced research evaluation services.

These services are being developed as integrated components of the OpenScienceLink platform based on the semantic and social networking capabilities of background FP7 projects as well as of the popular GoPubMed search engine. The OpenScienceLink services will be piloted with the active participation of over 1200 researchers from the consortium organizations. OpenScienceLink has also established a group of external users/stakeholders that will contribute additional users/researchers in the scope of the validation process, while also engaging in the sustainable use of the services.

OpenScienceLink will also study the business potential of open access paradigms, through investigating and pursuing multiple business models including author fees, hard copy sales, advertisements, sponsorships, as well as subscription based models. Furthermore, as part of its holistic approach, OpenScienceLink has devised a legal framework for regulating and reusing open scientific data.

1.2 Aspects of Evaluating OpenScienceLink

The OpenScienceLink project, as well as the design and functioning of the OpenScienceLink platform will be evaluated based on three aspects. The three aspects are defined to respond to the following questions, which are in turn discussed analytically in the remaining of Section 1.2:

- What is being evaluated?
- Which entities are involved?
- What methodologies are used in the evaluation?

1.2.1 Aspect 1: Subjects of evaluation

The subject of evaluation for the OpenScienceLink project and the developed platform is an extremely important notion, as it defines the domain and range of the metrics, indicators and resources that can be utilized. Overall, there are three basic subjects of evaluation within OpenScienceLink. First, the management of the project and the overall execution of the workplan, including the timely achievements of the predefined milestones. Second, the

OpenScienceLink platform, which has the main role to implement the five project pilots. Third, the performance and the outcome of the actual OpenScienceLink pilots.

With regards to the evaluation of the OpenScienceLink project execution, and based on the description of work of the project (OpenScienceLink Consortium, 2013), the major properties that need to be monitored pertain to the evaluation of the timely completion and submission to the EC of reports and deliverables, as well as the achievement of the project's milestones. In addition, the overall monitoring of the management of the project, e.g., financial management, distribution and organization of work, organization of project meetings, is also an important property.

As far as the evaluation of the OpenScienceLink platform is concerned, the main properties that will be monitored pertain to the technical aspects of the implementation and performance of the platform, the evaluation of the overall user experience, the degree of fulfilment of the collected user and technical requirements, and, the overall impact of the platform.

Finally, for the evaluation of the OpenScienceLink pilots the degree of fulfilment of the respective requirements and the overall impact are very important, in addition to the consideration of the degree of satisfaction of the engaged stakeholders and interested parties. Besides that, the methodology that has been used to accomplish the pilots' results has to be evaluated by comparing it to existing state of the art methodologies when applicable.

Subjects of Evaluation	Summary of Important Properties for Evaluation
OpenScienceLink project execution	Completion of reports and deliverables Achievement of milestones Project management
OpenScienceLink platform	Technical aspects User experience Fulfilment of requirements Impact
OpenScienceLink pilots	Fulfilment of requirements Impact Stakeholders' satisfaction Methodology

Table 1–Subjects of evaluation and respective important properties

1.2.2 Aspect 2: Entities of evaluation

In addition to the important properties for evaluation that we detailed in Section 1.2.1, each subject of evaluation also corresponds to one or more relevant entities to be evaluated. In the case of the OpenScienceLink project execution, these entities are the coordinator and the other consortium partners as well as the deliverable reports. The coordinator is responsible for project management and the achievement of the milestones, and for coordinating the participation of all consortium partners in creating and reviewing the project deliverables. The deliverables themselves are the second entity to be evaluated in the scope of the project execution.

For the OpenScienceLink platform, the only relevant entity is the software of the platform that is implemented by the technical partners. The technical aspects of the platform software determine the quality of the user experience as well as the degree to which the platform requirements are fulfilled.

The main entities to be evaluated in the context of the OpenScienceLink pilots are the Biomedical Data Journal and the partners at the OpenScienceLink pilot sites. The Biomedical Data Journal is the main result of the first pilot and a main product of the whole OpenScienceLink project, and the pilot site partners play a major role in the mobilization of resources for attracting pilot users and making pilots publicly known.

Subjects of Evaluation	Entities for Evaluation
OpenScienceLink project execution	Coordinator & consortium partners Deliverables
OpenScienceLink platform	Platform software
OpenScienceLink pilots	Biomedical Data Journal Pilot site partners

Table 2- Entities of evaluation

1.2.3 Aspect 3: Methodologies

In order to evaluate the different subjects of OpenScienceLink, we employ various methodologies that we adapt per case. Review forms are used to evaluate the deliverable reports. The overall progress of the project is evaluated via the official EC project review meetings. In order to get detailed feedback from stakeholders about their satisfaction with the performance of the individual pilots that are relevant to their interests, interviews will be conducted by consortium members. In addition to these specific methodologies for the evaluation of individual subjects, other methodologies are applicable for multiple subjects. These multi-purpose methodologies include questionnaires (for all subjects), as well as key performance indicators and related measures specifically for the OpenScienceLink platform and its pilots.

Subject of Evaluation	Methodologies
OpenScienceLink project execution	Questionnaires Review forms EC project review meetings
OpenScienceLink platform	KPIs and related measures Questionnaires
OpenScienceLink pilots	KPIs and related measures Questionnaires Interviews

Table 3-Methodologies of evaluation

2 Evaluation Methodologies and Tools

This section illustrates the methodologies and tools that are being used for evaluating the different OpenScienceLink subjects that were described in Section 1.2. Since Key Performance Indicators (KPIs) are one of the main methodologies that the project uses for this task, Section 2.1 gives a brief overview of the different perspectives that are covered by these KPIs. Section 2.2 gives a comprehensive list of the various KPIs for the individual OpenScienceLink pilots corresponding to these perspectives. Section 2.3 does the same for the overall platform, and Section 2.3.5 describes the technical evaluation of the platform. In Section 2.4, we describe the first pair of questionnaires prepared for getting direct feedback from consortium members and platform users, and we set the requirements for additional questionnaires that will be prepared.

2.1 Perspectives of Key Performance Indicators

The Balanced Scorecard approach is implemented in structuring key performance indicators for the OpenScienceLink project and their relation both to the project goals and objectives and to measures and methods of measurement.

The OpenScienceLink team constructed a scorecard with four perspectives (Deliverable 2.1, section 5) as follows:

- Mission Perspective
- Resource Perspective
- Internal Business Processes
- Learning and Growth Perspective.

Brief explanation of each of these perspectives, with examples of KPIs and respective measures is given below. Deliverable 2.1, to be amended twice during the project, provides details on the KPIs.

The Balanced Scorecard approach can and is being applied to structure and present metrics related to both the OpenScienceLink platform and the project. Further, it will be applied to assess results and performance in all pilots of the OpenScienceLink project.

2.1.1 Mission Perspective

The OpenScienceLink project aims to “introduce and pilot a holistic approach to the publication, sharing, linking, review and evaluation of research results, based on the open access to scientific information” to meet the growing needs and expectations of five groups of stakeholders¹: researchers, evaluators, publishers, funding agencies, and journalists and press (DOW).

Indicators and measures in this perspective relate to the reach-out to and engagement with stakeholders, as well as their satisfaction with the services provided by the OpenScienceLink platforms and the pilots.

For example, the numbers of stakeholders, per group, registered with the OpenScienceLink platform, and the frequency with which they use the OpenScienceLink services, are key performance indicators that will be tracked throughout the project lifecycle. The respective measures will be provided via OpenScienceLink platform’s functionalities.

Performance indicators, related to the satisfaction of users of the OpenScienceLink platform and services, will be measured via dedicated questionnaires as described in Section 2.4.

¹Or “customers” in the language commonly used in constructing balanced scorecards.

2.1.2 Resource Perspective

This perspective facilitates the proper tracking of costs while pursuing the goal of providing added value to stakeholders. ‘Costs’ may include the use of human resources, infrastructure (e.g. computing resources), or spending.

For projects with commercial aspects, e.g. journal publication, this perspective usually includes indicators and measures such as return on investment or profit over a certain period of time. In any case, the evaluation framework should incorporate measures of sustainability of a project/initiative or an organization.

Additional measures may indicate how well a certain project contributes to the overall organizational goals and objectives.

2.1.3 Internal Business Processes

This perspective is intended to indicate which are the core business processes and how efficiently they are performed by the organization. Typical measures are intended to show that project (or organizational) objectives are achieved in the constraints of time, cost, and quality.

An example in this perspective is the time to publication of a submitted paper (accepted by the editors upon the results of a peer-review process).

2.1.4 Learning and Growth Perspective

This perspective provides indication on the organizational capacity to grow, innovate, anticipate change and meet new and emerging demands.

Typical indicators and measures in this perspective seek to demonstrate that the organization (or a number of organizations collaborating on a project) is able to acquire new skills (by training or bringing in new talent), anticipates and responds to changing demands, and manages to utilize emerging opportunities.

As examples here may serve the number of young researchers involved in a project and additional training and qualification they receive, the number of involved researchers from organizations beyond project participants, and the coverage of new fields of knowledge in response to emerging research trends.

2.2 Key Performance Indicators for Individual Pilots

This section presents a comprehensive overview of the KPIs that apply for each of the individual pilots. As described in Section 0, KPIs are divided into four different perspectives.

2.2.1 Pilot 1

Pilot 1 will demonstrate the application and test the validity of concepts, process and tools, developed within the OpenScienceLink project, in the management of the Biomedical Data Journal—research dynamics-aware open access data journal—and, potentially, in the development of other open access data journals.

The publisher of the journal is a main stakeholder; however researchers, evaluators, funding agencies and, at a late stage, journalists and press, also have a vested interest in the success of this pilot.

Specific indicators and measures to assess the pilot are presented below in a structure, following the chosen four scorecard perspectives.

The overall objective is during the pilots to establish the *Biomedical Data Journal* as one of the top five journals in the field (before the start of the pilot, there are already five open access data journal focusing on biomedical and health issues).

2.2.1.1 Mission Perspective

The indicators and measures in this perspective serve to evaluate the visibility of the data journal to stakeholders and its reach-out, in absolute numbers as well as in terms of geographic and thematic coverage.

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Usage of the data articles	Number of views per month	-	1000	2000
	Number of downloads per month	-	150	300
	Citations	-	10	20
Usage of related datasets	Number of downloads per month	-	20	40
Usage by the media	Number of articles in popular media, including specialized blogs	-	3	7
Contributions	Submitted articles per quarter	-	15	30
Pool of reviewers	Number of researchers that have expressed an interest/ consent	-	20	100
Interested funders	Number of Research Sponsors and/ or Funding Authorities registered at the OSL platform	-	2	5
Geographic coverage	Number of countries represented on Editorial Board, authors or reviewers	5	10	30
Domain coverage	Number of biomedical and clinical research areas addressed by published data articles	-	10	15
Coverage by aggregators	Inclusion in indexing (including ISI ²) and aggregator services	-	3	5
Library usage	Inclusion in library catalogues	-	20	100

Table 4 – Mission Perspective KPIs for Pilot 1

²Thus providing for getting an impact factor in the future.

2.2.1.2 Resource Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Revenues from subscription for the hard copy	Number of paid subscriptions	-	10	40
Sponsorship	Number of funding agencies either directly sponsoring the journal or agreeing to sponsor the publication of individual contributions	-	2	4
Advertising	Value of advertisements in the journal or on the publisher's website in Euro	-	200	800

Table 5 - Resource Perspective KPIs for Pilot 1

2.2.1.3 Internal Business Processes Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Speed of the publication process (including peer review)	Average time from submission of a paper to its online publication, if accepted, in calendar day	-	50	45

Table 6 - Internal Business Processes KPIs for Pilot 1

2.2.1.4 Learning and Growth Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Coverage within the biomedical field	Special issues and calls for papers for such issues, covering fields represented on the Editorial Board	-	2	4
Adaptation to the changing research landscape	Number of identified new trends and addition of respective members to the Editorial Board	-	1	2
Expanding the application of the open access data journal paradigm	Number of concepts for new open access data journals developed	-	-	1

Table 7 - Learning and Growth Perspective KPIs for Pilot 1

2.2.2 Pilot 2

2.2.2.1 Mission Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Review request load	Number of review requests sent	-	200	400
Reviewer acceptance	Number of accepted review requests	-	150	300
Submitted reviews load	Number of submitted reviews	-	130	260
Success of reviewer recommendations	Number of review invitations based on platform suggestions	-	190	380
Usage by external venues	Number of venues for which reviews were requested	-	1	2
Number of Authorships	Number of authors whose publications were put up for review (cumulative)	-	100	240

Table 8 – Mission Perspective KPIs for Pilot 2

2.2.2.2 Resource Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Speed of the review process	Control group	0	>=15%	>=30%

Table 9 – Resource Perspective KPIs for Pilot 2

2.2.2.3 Internal Business Processes Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Attraction of more competent reviewers	Questionnaire responses	0	>=50%	100%
Increased number of reviewers per review	Control group	0	>=50%	100%

Table 10 – Internal Business Processes KPIs for Pilot 2

2.2.2.4 Learning and Growth Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Profile growth	Number of new platform profiles created by invited reviewers	-	100	120

Table 11 – Learning and Growth Perspective KPIs for Pilot 2

2.2.3 Pilot 3

2.2.3.1 Mission Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Trend searches	Number of executed trend searches	-	6000	18000

Table 12 – Mission Perspective KPIs for Pilot 3

2.2.3.2 Resource Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Acceleration of trend identification	Questionnaire (percentage of users that identified trends faster)	-	40%	65%

Table 13 – Resource Perspective KPIs for Pilot 3

2.2.3.3 Internal Business Processes Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Trend detection F-Measure	F-Measure of hot topics predicted correctly by the platform for the following year	-	$\geq 20\%$	$\geq 30\%$

Table 14 – Internal Business Processes KPIs for Pilot 3

2.2.3.4 Learning and Growth Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Expansion of Biomedical DataJournal through Trend Detection	Number of special issues for Biomedical DataJournal based on detected “hot topics”	-	1	2

Table 15 – Learning and Growth Perspective KPIs for Pilot 3

2.2.4 Pilot 4

2.2.4.1 Mission Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
User Attraction	Number of Researchers /Scholars having used the pilot services at least once	≥ 200	≥ 500	≥ 1000
User Engagement	Number of Researchers /Scholars having used the pilot services more than once	≥ 100	≥ 300	≥ 800

Table 16 – Mission Perspective KPIs for Pilot 4

2.2.4.2 Resource Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Number of funded projects (<i>beyond OpenScienceLink</i>)	Number of projects in which the pilot models, services and tools are used and further developed	-	≥ 1	≥ 2
Number of Interested Stakeholders	Number of Stakeholders to whom the pilot has been presented and who have expressed interest	-	≥ 1	≥ 2
Pilot Visibility: Publications	Number of pilot-related scientific papers published at journals, conferences and workshops	-	≥ 3	≥ 5
Pilot Visibility: Web Presence	Number of posts at blogs and web sites about the pilot	≥ 1	≥ 3	≥ 5

Table 17 – Resource Perspective KPIs for Pilot 4

2.2.4.3 Internal Business Processes Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Correctness of implicitly identified relationships among researchers	Percentage of recommendations which are relevant to the expert's topic/domain and are not part of his existing collaborations	$\geq 50\%$	$\geq 70\%$	$\geq 85\%$
Correctness of implicitly identified relationships between researchers and research groups	Percentage of recommendations which are relevant to the expert's topic/domain and are not part of his existing collaborations	$\geq 50\%$	$\geq 65\%$	$\geq 80\%$

Table 18 - Internal Business Processes KPIs for Pilot 4

2.2.4.4 Learning and Growth Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Coverage within the biomedical field	Number of distinctive biomedical and clinical research areas (such as cardiology, pharmacology, etc) in which researchers may be able to find collaborations	≥ 10	≥ 15	≥ 20

Table 19 - Learning and Growth Perspective KPIs for Pilot 4

2.2.5 Pilot 5

2.2.5.1 Mission Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Stakeholders' Interest	Number of stakeholders (e.g., publishers) indicating interest in the developed evaluation metrics	-	≥ 2	≥ 3
Metrics Use	Number of entities which have introduced at least one of the evaluation metrics to their evaluation process	-	≥ 1	≥ 2

Table 20 – Mission Perspective KPIs for Pilot 5

2.2.5.2 Resource Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Expressed Interest of Stakeholders	Number of Stakeholders (e.g., publishers) to whom the pilot has been presented and who have expressed interest (through discussions, letter of support, etc)	-	≥ 2	≥ 3
Pilot Visibility: Publications	Number of pilot-related scientific papers published at journals, conferences and workshops	-	≥ 3	≥ 5
Pilot Visibility: Web Presence	Number of posts at blogs and web sites about the pilot	≥ 1	≥ 3	≥ 5

Table 21 – Resource Perspective KPIs for Pilot 5

2.2.5.3 Internal Business Processes Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Acceptability of research evaluation metrics	Percentage of experts indicating that the developed metrics are of value for the research community (Questionnaires)	-	$\geq 70\%$	$\geq 80\%$
Improvement of research evaluation metrics: experts opinion	Percentage by which the research evaluation metrics are considered improvement of existing ones, such as g-index, impact factor, etc (Questionnaires)	-	$\geq 10\%$	$\geq 20\%$
Improvement of research evaluation metrics: comparison	Percentage of past research papers for which existing evaluation metrics required at least 1 year more than the proposed metrics to indicate their importance in the field	-	$\geq 5\%$	$\geq 10\%$

Table 22 – Internal Business Processes KPIs for Pilot 5

2.3 Key Performance Indicators for the Overall Platform

In addition to the individual pilots, it is also necessary to evaluate the overall platform. This section describes the KPIs that will be used for this purpose. Sections 2.3 to 0 list the KPIs that correspond to the same perspectives that were covered by the KPIs for the individual pilots, and Section 2.3.5 gives the details for an additional set of KPIs that will be used to evaluate the technical side of the platform.

2.3.1 Mission Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
User participation	Number of user registrations in the OpenScienceLink platform	-	≥ 400	≥ 1100

Active user participation	Number of users using the system at least once per month within a 3 month period	-	≥ 150	≥ 600
Stakeholder participation	Number of institutions (beyond the consortium) involved in the OpenScienceLink pilot operations	-	≥ 20	≥ 30
Funder participation	Number of research sponsors and/or funding authorities (beyond the consortium) involved in the OpenScienceLink pilot operations	-	≥ 2	≥ 5
International participation	Number of countries from which the OpenScienceLink Platform has been used at least once	-	≥ 10	≥ 30
Active international participation	Number of countries with active OpenScienceLink users (i.e., using the system at least once per month within a 3 month period)	-	≥ 9	≥ 25
Research domain involvement	Number of Biomedical and Clinical Research areas (such as cardiology, pharmacology, etc.) with researchers registered to the OpenScienceLink platform	-	≥ 8	≥ 10
Active research domain involvement	Number of biomedical and clinical research areas with active OpenScienceLink users	-	≥ 5	≥ 8
Open access	Number of indexed open access journal papers and datasets	-	≥ 2000000	≥ 3000000

Table 23 - Mission Perspective KPIs for Overall Platform

2.3.2 Resource Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Funded projects beyond OpenScienceLink	Number of projects in which the OpenScienceLink services, models and tools are used and further developed	-	9	>=11
Involved Stakeholders in the partnership	Number of stakeholders involved in the partnership	-	9	9
Stakeholders with commercial interest	Number of stakeholders having formally expressed commercial interest	-	0	>=3
Journal publications	Number of OpenScienceLink-related scientific journal papers published by consortium members	>=1	>=4	>=8
Blog and website publications	Number of posts on blogs and websites about OpenScienceLink	>=1	>=3	>=5
Conference publications and presentations	Number of OpenScienceLink-related papers, presentations and presence at conferences, workshops and exhibitions	>=3	>=7	>=13
Joint workshops with other projects or related national initiatives	Number of workshops held with other projects or related initiatives	-	>=2	>=5
OpenScienceLink website visitors	Number of unique visitors to the OpenScienceLink website	-	>=200	>=400
Links to OpenScienceLink website	Number of external websites referring to OpenScienceLink website	>=10	>=15	>=20
OpenScienceLink press releases	Number of OpenScienceLink-related press releases published by consortium members	>=2	>=5	>=10

Project dissemination outside Europe	Number of OpenScienceLink-related events to which consortium members participated outside Europe	-	-	≥ 2
Project marketing	Number of OpenScienceLink-related marketing materials material (e.g., leaflets, banners, posters) produced and distributed by consortium members	≥ 100	≥ 400	≥ 800
Targeted contacts and approached potential customers	Number of stakeholders and potential customers (publishers, research organizations, universities) contacted by consortium members	-	≥ 15	≥ 25
Reached policy and decision makers	Number of policy and decision makers contacted by consortium members	≥ 1	≥ 3	≥ 5

Table 24 – Resource Perspective KPIs for the Overall Platform

2.3.3 Internal Business Processes Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Increase in data paper creation	Increase in number of data papers created per researcher	-	$\geq 15\%$	$\geq 50\%$
Creation of Best Practices (BPs) and Blueprints	Number of distinct Best Practices (BPs) and Blueprints Produced	-	≥ 2	≥ 8

Table 25 – Internal Business Processes KPIs for the Overall Platform

2.3.4 Learning and Growth Perspective

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Involvement of young researchers in the project	Number of PhD students and Postdocs participating in the project	≥ 10	≥ 10	≥ 10
Career advancement of the OSL team	Number of received PhD degrees and relevant habilitations	-	1	1

Table 26 – Learning and Growth Perspective KPIs for the Overall Platform

2.3.5 Technical Perspective

In addition to the aforementioned, with regards to the technical evaluation of the platform, the following additional measures will be considered to evaluate the technical quality, breadth and depth.

KPI	Measure	Expected progress (along the phases of the pilot)		
		Year 1	Year 2	Year 3
Domain coverage	Number of ontologies used in the platform	-	≥ 2	≥ 4
	Number of ontology concepts	-	≥ 30000	≥ 250000
Annotation	Average number of correctly predicted ontology concept annotations per paper or dataset (including abstract only entries)	-	≥ 3	≥ 5
Bug fixing	Percentage of reported bugs fixed	-	$\geq 30\%$	$\geq 75\%$
Uptime	Percentage of platform uptime	-	$\geq 95\%$	$\geq 99\%$
Average response time	Average response time of a user's input in seconds	-	≤ 2	≤ 1
Concurrent usage	Supported maximum number of concurrent platform users	-	100	500

Table 27– Technical KPIs for the platform

2.4 Questionnaires

There are many ways to measure the performance of the OpenScienceLink services directly using data that can be collected automatically while running the platform (e.g., the number of users). This is the case for most of the criteria we described in Sections 2.2 and 0. However, there are also “softer” criteria, e.g., relating to the quality of the user experience or the overall satisfaction with the project’s progress, that can not be measured as easily. In order to be able to also measure such criteria, we have designed online questionnaires that can be submitted to users of the different functionalities in order to provide them with a fast and easy way to provide feedback about their experience with the OpenScienceLink platform. This feedback will then be used by the technical partners for prioritizing required updates and designing the next iteration of the platform. The following subsections describe the first two questionnaires that have already been distributed after the end of the first year of the project. Additional questionnaires will be prepared according to emerging feedback needs for the continuation of the project.

2.4.1 OpenScienceLink Progress

The first questionnaire was designed with the intention of measuring the internal satisfaction with the project’s progress among the members of the consortium. Most questions can be answered with a numerical value on a scale between 1 (“disappointing”) and 5 (“excellent”). The following questions followed this template:

- Please rate the overall progress of the OpenScienceLink project for the first year
- Please rate the overall management of the OpenScienceLink project for the first year
- Please rate the technical achievements of the OpenScienceLink project for the first year
- Please rate the quality control of the project deliverables for the first year
- Please rate the quality of the pilot specifications, including the elicitation of user requirements from all stakeholders
- Please rate the dissemination activities of the project for the first year, including the pilot preparation activities
- Please rate the exploitation plan and respective activities for the first year of the project
- Please rate the preparation of the OpenScienceLink Biomedical Data Journal

In addition to these questions that required numerical responses, the following two questions requested textual answers in order to retrieve in-depth feedback from the consortium members about which aspects of the project they consider most and least successful:

- Please enter three aspects of the project that you think were the major achievements during the first year
- Please enter three aspects of the project that you think can be definitely improved within the remaining of the project

This questionnaire will be submitted to all consortium members at the end of each year of the project in order to get a clear indication for which aspects of the project are fulfilling expectations and which ones have to be improved upon in the following year.

2.4.2 General User Feedback for the platform

The second questionnaire was designed with the intention of evaluating the first release of the OpenScienceLink platform (Year 1). The questionnaire covered the following evaluation aspects: platform as a whole, pilots operations, user satisfaction, novelty, and recommendations for future features. In the following we present the questions for each of the aspects, and the type of answer that was requested.

Evaluation of the platform as a whole

Please give an overall rating for the OpenScienceLink platform as a whole.

Answer type: scale between 1 (“disappointing”) and 5 (“excellent”)

Please enter the three most positive aspects of the platform in its current form.

Answer type: text

Please enter the three aspects of the platform that you feel can be improved.

Answer type: text

Pilot operations

Please rate the functionality of Pilot 1, i.e., the upload of datasets and the overview of uploaded datasets.

Answer type: scale between 1 (“disappointing”) and 5 (“excellent”)

Please enter the aspects of Pilot 1 that can be improved.

Answer type: text

The identical questions were also asked for each of the other pilot functionalities, i.e., the creation of review calls, the analysis of trends for a given query, the suggestion of collaborations and the evaluation of research entities within the platform.

User satisfaction

How intuitive is the user interface of the platform in your opinion?

Answer type: scale between 1 (“Very unintuitive”) and 5 (“Very intuitive”)

Would you recommend the platform to colleagues?

Answer type: scale between 1 (“Not at all”) and 5 (“Absolutely”)

Will you use the platform again in the future?

Answer type: scale between 1 (“Definitely not”) and 5 (“Definitely yes”)

Please rate the platform's response time to your input.

Answer type: scale between 1 (“Very slow”) and 5 (“Very fast”)

Recommendations for future releases

Please enter the aspects of the user interface that can be improved.

Answer type: text

Please enter a wish list of functionalities you believe are interesting to be included in future releases.

Answer type: text

Novelty

Please enter the functions of the platform that you have not seen in any other related tool or engine.

Answer type: text

2.4.3 Other Questionnaires

In addition to the planned iteration of the evaluation of the project and the platform based on the aforementioned questionnaires for Year 2 and 3, we are planning to distribute individual questionnaires for the evaluation of each pilot separately. The evaluation perspectives in these five questionnaires are customized to the operations and output of each of the pilots, and will be partially based on the respective Key Performance Indicators. However, the power of the evaluation in this case lies in the ability that the questionnaires give towards enabling the feedback of the participants with regards to the pilot aspects that need to be improved. Hence, the center of gravity in these questionnaires will be placed in the design of questions that efficiently gather the feedback of stakeholders and users of the pilots, in order to improve the pilot operations in the remaining of the project.

3 Evaluation of Legal Requirements

The following requirements have been developed from the legal and contractual framework set forth in D3.2 and the forthcoming first revision of D3.2. It will serve as a guidance to evaluate how the OSL platform adheres to the legal requirements. The legal requirements will address the different fields of law that are relevant for the *OpenScienceLink (OSL)* platform.

This chapter will clearly indicate whether a legal requirement must be fulfilled to be legally compliant or whether the requirement is considered a suggestion. In the first case, we will use the terms must or should, in the latter case we will use the term could.

3.1 Data Protection Requirements

R1	<p><i>Data Protection compliance</i></p> <p>If personal data is processed within the European union, the <i>OSL</i> infrastructure and all entities involved <u>must</u> comply with national and European data protection legislation.</p>
R2	<p><i>Allocation of roles and responsibilities</i></p> <p>Designate the <i>data controller</i> and, if appropriate, the <i>data processor</i></p> <ul style="list-style-type: none"> • The <i>controller</i> is the natural or legal person which alone, or jointly with others, determines the purpose and means of the processing of personal data. The <i>controller</i> is the one primarily responsible and liable for the legality of the processing and the fulfillment of obligations towards the National Data Protection Authority (<i>NDPA</i>) and the data subjects. • The <i>processor</i> is the party processing personal data on behalf of the <i>controller</i>. This will typically be a sub-contractor or a specialized third-party company. • The relationship between the <i>controller</i> & <i>processor</i> <u>must</u> be governed by a contract wherein the different obligations of the different parties are well indicated. • In case of more than one <i>data controller</i> and/or <i>processor</i>, indicate a single point of contact (article 17 of the Data Protection Directive)
R3	<p><i>Ensure legitimacy of processing</i></p> <p>Article 7 and 8 of the Data protection Directive provide an exhaustive list of legitimate grounds on which the processing can be based. For the <i>OSL</i> platform, the ground for processing <u>should</u> be the <i>data subject's consent (e.g. via an electronic or paper-based consent form).</i></p>

	All other personal data such as the research data, which will be published on the platform, <u>must</u> be properly anonymized.
R3.1	<p><i>Requirements for consent</i></p> <p>The consent <u>must</u> be:</p> <ul style="list-style-type: none"> - Unambiguous - Specific, distinctive and intelligible - Based on accurate, full and understandable information - Genuine and freely given, absent of any pressure - Given before any processing occurs - Given with the option to withdraw his or her consent and stop any further processing of the personal data - Explicit when it concerns sensitive data in the sense of art. 8 95/46/EC
R4	<p><i>Data Quality Principles</i></p> <p>The personal data and the processing <u>must</u> comply with the following data quality principles for processing personal data:</p> <p>Personal data must be:</p> <ul style="list-style-type: none"> - Processed fairly and lawfully - Collected only for specified³, explicit and legitimate purposes and not further processed in a way incompatible with those purposes <ul style="list-style-type: none"> o The <i>OSL</i> infrastructure must have a <u>privacy notice</u> that clearly articulates the purpose of the data processing and any subsequent use must be limited to those articulated purposes o Before commencing the processing take the time to (re)consider whether all data being processed are both <u>adequate and non-excessive</u> to achieve the purposes of the <i>OSL</i> platform. o Clearly indicate whether information is optional or required - Adequate, relevant and not excessive in relation to the purposes for which it is collected and/or further processed - Deleted or rendered anonymous when no longer necessary for the purpose <ul style="list-style-type: none"> o Prior to any processing operation of personal data, the storage duration of each data element <u>must</u> be specified, either individually or by category, for every entity that is involved in the processing. Limit storage duration

³The purpose(s) of processing MUST be identified in advance (prior to initial collection, transfer, etc.)

	<p>whenever possible yet ensure that the data is readily available to authorized entities as long as it is necessary.</p> <ul style="list-style-type: none"> - Securely deleted, i.e. the data should not be retrievable after deletion - Accurate and up to date. <ul style="list-style-type: none"> o Procedures must be in place on how to report and deal with suspected inaccuracies.
R5	<p><i>Transparency and administrative requirements</i></p> <p>The data controller and the <i>OSL</i> infrastructure must ensure the data subject's rights.</p> <p>The data controller <u>must</u>:</p> <ul style="list-style-type: none"> - Meet all notification and authorization requirements for data processing that may derive of national law of the competent Member State - Provide the data subject with <u>sufficient information</u>, <u>at least</u>(1) the identity of the controller, (2) the categories of data to be processed, (3) whether the info is obligatory or voluntary, (4) the purpose of the processing, (5) the recipients of the data and (6) the further rights to access and to rectify. This information <u>could</u> be provided in the <u>privacy notice</u> (cf. R4). <ul style="list-style-type: none"> o Where appropriate, data subjects should get more detailed information as to the processing operations performed upon their personal data (e.g. at what time individual processing operations took place, under which pretext, etc.). - Provide the data subject with <u>the right to obtain intelligible information</u> from the data controller without expense or excessive delay - Support the data subject's rights to legitimately <u>rectify, reply, revoke, erase or block</u> his or her personal data - Once the data controller has been determined, clearly <u>declare</u> this partner as such and the applicable jurisdiction in all relevant documents (terms & conditions, privacy notice, etc.) - Each organization must ensure that is has filed a notification to the <u>National Data Protection Authority</u> <i>prior</i> to each activity involving personal data processing. Be prepared for any requests by the Commission for additional items of information related to the processing. - The <u>consent of the data subject</u> must be obtained <i>prior</i> to any processing of his personal data. A <u>versioning and archiving system</u> must be in place for the

	informed consents given by data subjects to enable later verification that appropriate notice was given.
F6	<i>Security and confidentiality requirements</i>
	The <i>OSL</i> infrastructure shall implement <u>advanced organizational and technical security measures</u> to ensure confidentiality, integrity and authenticity.

Table 28 – Data Protection Requirements

3.2 Intellectual Property Rights Requirements

R1	<i>National law compliance</i>
	The <i>OSL</i> infrastructure and all entities involved must comply with the laws of the competent Member State.
R2	<i>Determine right holder of the work</i>
	There will be copyright on the scientific publications or papers (if held original). Several parties can hold this copyright: the initial author, the employer, more than one author or even publishers.
R3	<i>Establish a clear copyright notice on the OSL interface</i>
	When the <u>copyright holder</u> publishes a copyrighted work on the <i>OSL</i> platform, he or she has to adhere to the copyright policy of <i>OSL</i> . This policy should give information to copyright holders, authors, platform users and third parties on: <ul style="list-style-type: none"> - Intellectual property rights transfer - Licensing policy - Sufficient technical and organizational measures to avoid intellectual property rights infringements - Ethical responsibilities (i.e. no copyright infringements, no plagiarism, etc.) - Contact point for questions
R3.1	<i>OSL Licensing policy</i>
	The <i>OSL</i> platform <u>must</u> establish a clear licensing policy. <i>In casu</i> the <i>OSL</i> platform will use a CC BY-NC-SA 4.0 license. Copyright holders will publish their work on the platform under this license, which means they will directly enter into a contract (the CC license) with the users/re-users of their work. This policy <u>should</u> also make clear whether the license also applies to metadata.
R3.2	<i>Third parties licensing policy</i>

	In case the <i>OSL</i> platform would use content from third parties (such as PUBMED), the latter's terms of use <u>must</u> be checked to see their licensing conditions and on what basis <i>OSL</i> can use or re-use their content.
R3.3	<i>OSL licensing policy – commercial use</i> The licensing policy that <i>OSL</i> will use, does not support commercial use of the works, i.e. against payment. In this situation, a new license <u>should</u> be created between the end user and the copyright holder. For this, guidelines and/or a contact form <u>should</u> be provided that could initiate negotiations between the end user and the copyright holder.
R3.3.1	<i>Disclaimer</i> These guidelines or this form <u>should</u> contain a disclaimer in case the person that posted the work is actually not the right holder of the intellectual property rights.

Table 29 – Intellectual Property Rights Requirements

3.3 Other requirements

R1	<i>Terms and conditions</i> It <u>could</u> be advantageous for the <i>OSL</i> platform to define terms and conditions to which other parties, for example the users, have to adhere to when using the <i>OSL</i> platform. At the same time, another party with which the <i>OSL</i> platform cooperates will likely have its own conditions and terms with which <i>OSL</i> will have to comply with.
R1.2	<i>Terms and conditions/contracts</i> <i>OSL</i> <u>should</u> close contracts with related parties and/or provide terms & conditions they have to adhere to.
R1.3	<i>Terms and conditions of other parties</i> If the terms & conditions of the other party apply to the <i>OSL</i> platform, <i>OSL</i> <u>must</u> follow the applicable terms & conditions of the other party OR <i>OSL</i> <u>must</u> close specific contracts with the exclusion of terms & conditions.
R2	<i>Limitation of liability</i> The <i>OSL</i> platform <u>should</u> only guarantee the provisioning of functions the system can actually provide. The <i>OSL</i> platform <u>could</u> limit its liability contractually to the extent legally allowed under national laws.

R3	<i>Evidence preservation</i>
	To be able to provide evidence in case of claims, technical or organizational measures <u>should</u> be implemented, e.g. logging

Table 30 – Other Requirements

4 Conclusions

This report detailed the relevant subjects, properties and methodologies for the evaluation of the OpenScienceLink project. The deliverable is structured in a way that gives individual emphasis to the evaluation of the project, the platform and the pilots. In this direction, Key Performance Indicators are arguably the most important instrument for monitoring the project's work towards the realization of its objectives. The OpenScienceLink KPIs belong to four main perspectives, as described in Section 2.1:

- Mission perspective
- Resource perspective
- Internal Business processes
- Learning & Growth perspective

Taking into consideration these perspectives, we presented an expansive list of KPIs for each of the pilots as well as the overall OpenScienceLink platform.

In addition to the KPIs, the different aspects of the OpenScienceLink project will be evaluated using questionnaires, review forms and stakeholder interviews. In order to prepare the evaluation of OpenScienceLink from the legal perspective, the complete set of legal requirements that the platform needs to adhere to has been presented in Section 3.

5 References

OpenScienceLink Consortium. (2013). *OpenScienceLink: OpenSemantically-enabled, Social-aware Access to Scientific Data*. EC.