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Stakeholders, Technical and Financial Evaluation

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Executive Summary

The current deliverable presents a multi-facet evaluation of the 3rd year version of the OSL platform covering different perspectives. First, we have collected and analyzed feedback from all stakeholders ofthe OpenScienceLink ecosystem, including researchers, scholars, universities, research organizations, researchsponsors, funding agencies, funding authorities, open-access publishersand the media. The evaluation was based on severalmodalities including questionnaires, interviews, satisfaction surveys and other tools that were specified as partof the project's evaluation framework. At a second level, we present evaluation of the project's platform and services froma technical and technological perspective in terms of performance, scalability, expandability, robustness, novelty and technological longevity.The third part is devoted to the business and financial evaluationof the OpenScienceLink services, according to the different business models for open access that were studied in WP9. In general this task provides insights for the formulation of realistic business and sustainabilityplans. As a result, the current deliverable is structured following the aforementioned rationale, presenting analytically the results of evaluation based on the tools and methodologies (questionnaires, interviews,Key Performance Indicators (KPIs), measures etc) that were defined at deliverable 8.1.

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1 Introduction

1.1 Objectives of Evaluation

This task gives emphasis on the multi-facet evaluation of the project's results (i.e. covering multiple perspectives), as well as on the elicitation and documentation of best practices associated with open access to scientific information. The main objectives of the evaluation process are to:

Establish an evaluation framework (including scientifically sound methodologies, KPIs and tools) for the disciplined evaluation of the project's results.

To evaluate the project's results with the involvement of all stakeholders of the OpenScienceLink platform i.e. taking into account and analyzing feedback from all stakeholders.

To evaluate the OpenScienceLink from a technical and technological perspective.

To evaluate the OpenScienceLink results against their business potential and the possibility of rendering financial returns/benefits for the various stakeholders.

To elicit and document best practices and blueprints associated with the implementation, exploitation and use of models for open access to scientific information.

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.

1.2 Evaluation Methodology

The evaluation methodology includes a set of methodological tools tools and KPIs for evaluating the project from a usability, business and technical perspective, while at the same time eliciting and analyzing the opinion/feedback of all stakeholders.

Key Performance Indicators are arguably an important instrument for monitoring the project's work and evaluating the results. Taking into consideration four main perspectives (Mission perspective, resource perspective, Internal Business processes, Learning & Growth perspective), we have composed 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 are evaluated using ***questionnaires***, ***review forms*** and ***stakeholder interviews***.

2 Stakeholders Evaluation

In order to get detailed feedback from stakeholders about their satisfaction with the performance of the project interviews were conducted by consortium members. In addition to the evaluation of individual subjects multi-purpose methodologies included questionnaires (for all subjects), as well as key performance indicators and related measures specifically for the OpenScienceLink platform and its pilots.

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**.

2.1 Management and Overall Progress of the Project

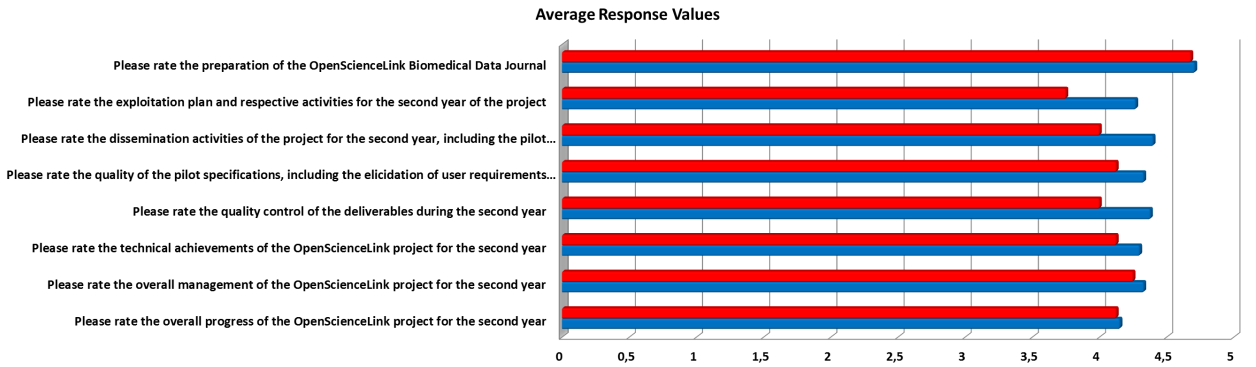
With regards to the evaluation of the OpenScienceLink project execution, and based on the description of work of the project (OpenScienceLink Consortium, 2013), the major properties that were monitored pertain to the evaluation of the timely completion and submission to the EC of reports and deliverables, 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.

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). 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 is used by the technical partners for prioritizing required updates and designing the next iteration of the platform.

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 third year
- Please rate the overall management of the OpenScienceLink project for the thirdyear
- Please rate the technical achievements of the OpenScienceLink project for the third year
- Please rate the quality control of the deliverables during the third year
- Please rate the updating process of the pilot specifications, including the updates of the user requirements from all stakeholders
- Please rate the dissemination activities of the project for the third year, including the pilot preparation activities.
- Please rate the exploitation plan and respective activities for the thirdyear of the project
- Please rate the operation of the OpenScienceLink Biomedical Data Journal

The results of the questionnaire are shown in the following chart. The values (x-axis) represent the weighted average of the responses by the questionnaire participants, where a value of designates the worst score, and the value of 5 the top (best) score. Overall, the internal evaluation via the questionnaire shows that within the third year the progress was very satisfactory.



	Please rate the overall progress of the OpenScienceLink project for the second year	Please rate the overall management of the OpenScienceLink project for the second year	Please rate the technical achievements of the OpenScienceLink project for the second year	Please rate the quality control of the deliverables during the second year	Please rate the quality of the pilot specifications, including the elicidation of user requirements from all stakeholders	Please rate the dissemination activities of the project for the second year, including the pilot preparation activities	Please rate the exploitation plan and respective activities for the second year of the project	Please rate the preparation of the OpenScienceLink Biomedical Data Journal
Year 2 Evaluation	4,125	4,25	4,125	4	4,125	4	3,75	4,68
Year 3 Evaluation	4,153	4,33	4,3	4,38	4,33	4,4	4,27	4,71

Figure 1: Summary of numeric questionnaire response values.

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 third year
- Please enter three aspects of the project that you think can be definitely improved in the future

The results of these two questionnaires are summarized in the following figures. As the results suggest, among the most important achievements in the third year of the project has been the operation of the Biomedical Data Journal, and the updated features of the OpenScienceLink platform (publicly available at: http://opensciencelink.org). In parallel, the participants to the questionnaire suggested that the exploitation of the projects' resultsisthe main aspect which should attract focus in the future, given the very important results of the project and their impact.

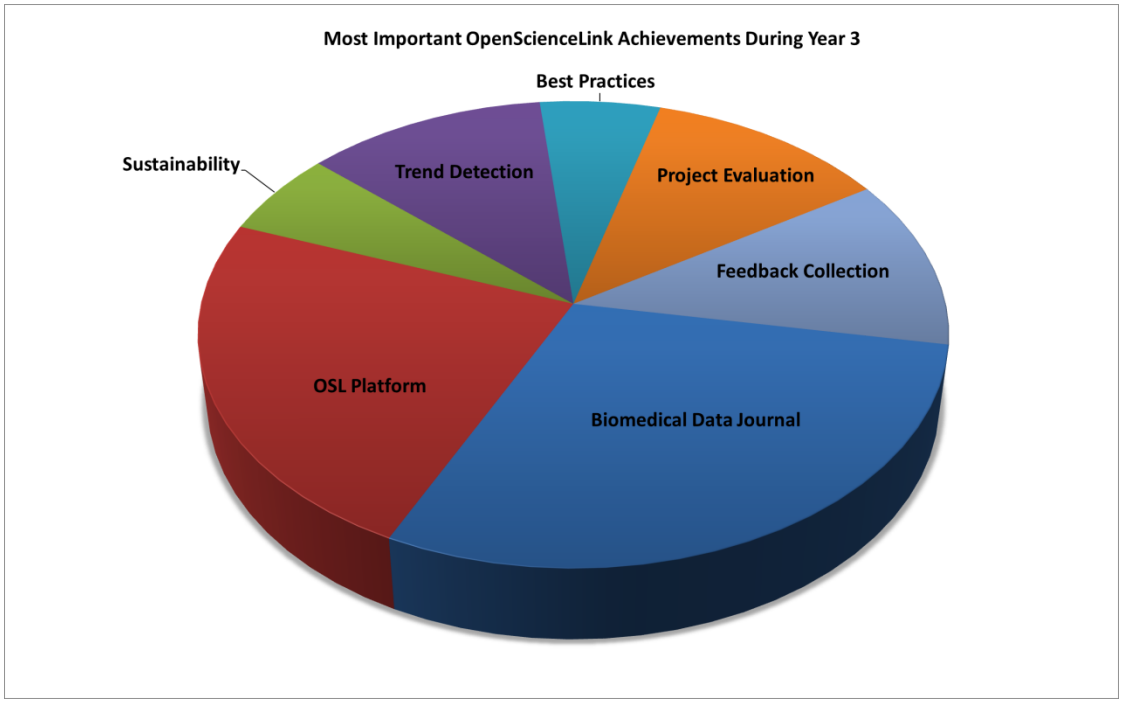


Figure 2: Summary of the most important OpenScienceLink project achievements according to questionnaire responses.

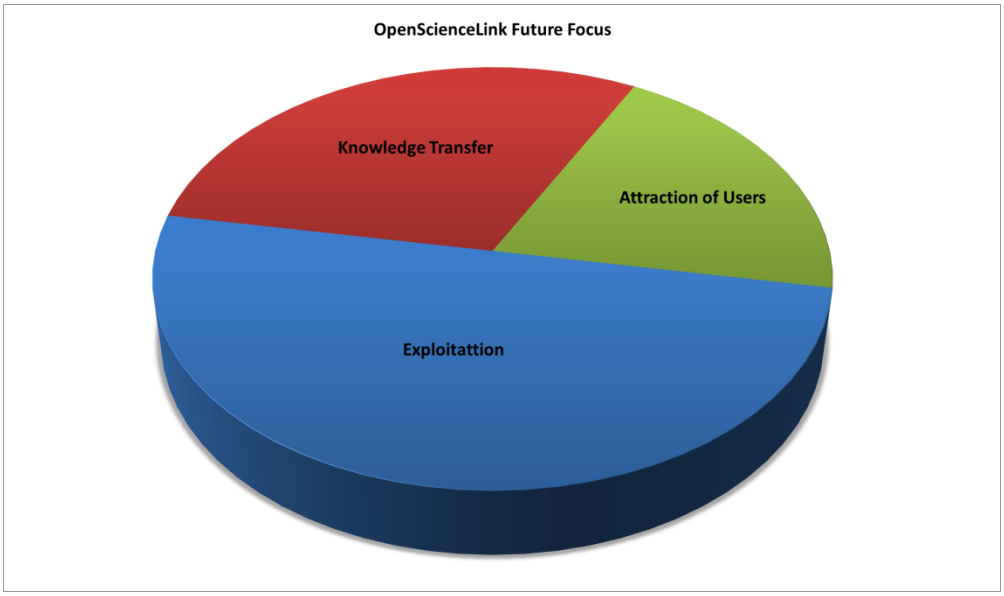


Figure 3: Summary of OpenScienceLink project aspects that should attract more focus in the future.

2.2 Evaluation of the Overall Platform's Performance

As far as the evaluation of the OpenScienceLink platform is concerned, the main properties that were 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.

A questionnaire was designed with the intention of evaluating the release of the OpenScienceLink platform (Year 3). The collected data covered the following evaluation aspects: platform as a whole, user satisfaction, novelty, and recommendations for future features. In the following we present the results of this evaluation.

2.2.1 Evaluation of the Platform as a Whole

For the purposes of the evaluation of the OpenScienceLink platform as a whole, the following questions were distributed to the partners:

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

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

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

Please rate the functionality of Pilot 2, i.e., the creation of review calls.

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

Please enter the aspects of Pilot 2 that can be improved

Answer type: text

Please rate the functionality of Pilot 3, i.e., the analysis of trends for a given query.

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

Please enter the aspects of Pilot 3 that can be improved

Answer type: text

Please rate the functionality of Pilot 4, i.e., the suggestion of collaborations.

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

Please enter the aspects of Pilot 4 that can be improved

Answer type: text

Please rate the functionality of Pilot 5, i.e., evaluation of research entities.

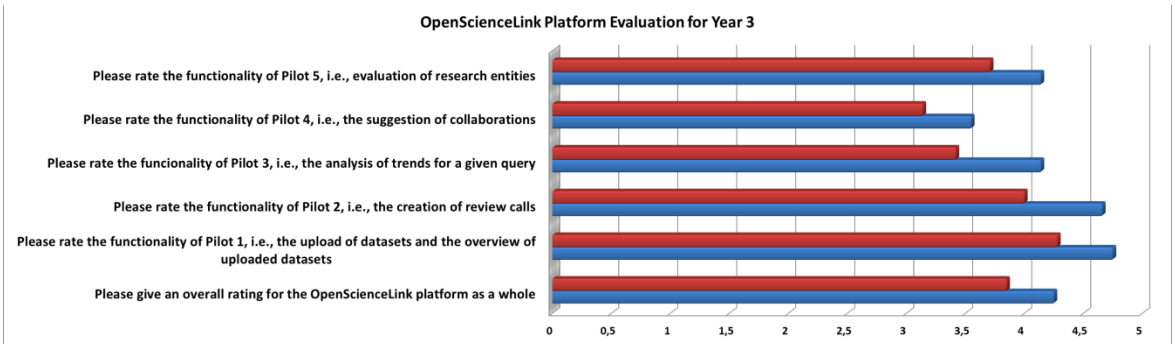
Answer type: scale between 1 (“disappointing”) and 5 (“excellent”)

Please enter the aspects of Pilot 5 that can be improved

Answer type: text

The results of this evaluation are summarized in the following figure. With regards to the most positive aspects of the platform in its current form, the three major points were: simple and clear interface, fast response time, and, up-to-date results. Regarding the most important aspects of the platform that may be improved, these include: explanation or user guidance of the

platform functionalities, more details in the explanation of the results, and, the suggestion that terms and conditions, especially with regards to the privacy policy, should be clarified.



	Please give an overall rating for the OpenScienceLink platform as a whole	Please rate the functionality of Pilot 1, i.e., the upload of datasets and the overview of uploaded datasets	Please rate the functionality of Pilot 2, i.e., the creation of review calls	Please rate the funcionality of Pilot 3, i.e., the analysis of trends for a given query	Please rate the functionality of Pilot 4, i.e., the suggestion of collaborations	Please rate the functionality of Pilot 5, i.e., evaluation of research entities
Year 2 Responses	3,85	4,28	4	3,42	3,14	3,71
Year 3 Responses	4,25	4,75	4,66	4,14	3,55	4,14

Figure 4: Evaluation of the OpenScienceLink platform as a whole.

2.2.2 User Satisfaction

For the purposes of the evaluation of users satisfaction, the following questions were included in questionnaires :

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

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

Please rate the platform's response time to your input

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

Will you use the platform again in the future?

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

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

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

Answer type: text

The results of this evaluation are summarized in the following figure. The evaluation took place considering and testing again the last version of the OpenScienceLink platform. Overall, the response time of the platform was evaluated very well, with the rest of the questions suggesting that the user interface was significantly improved compared to the alpha release.

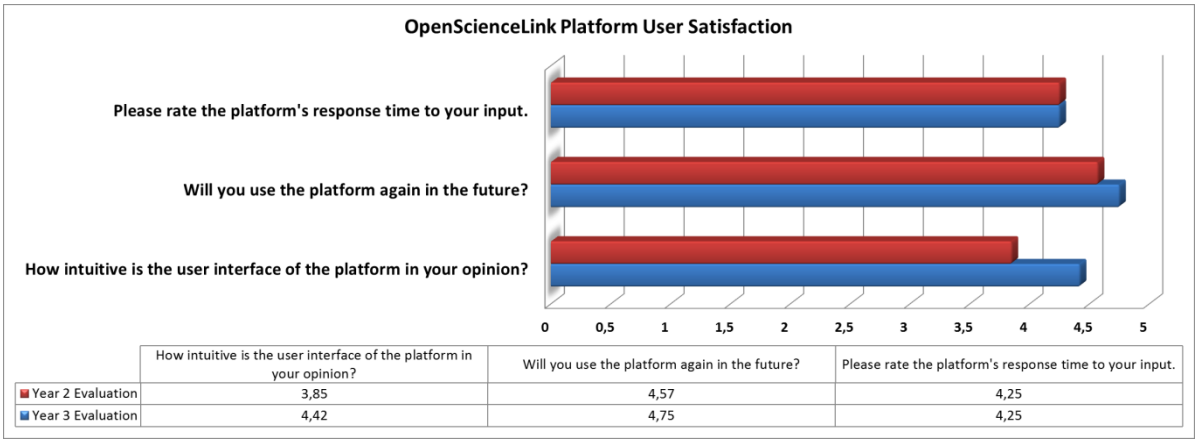


Figure 5: Summary of platform user's satisfaction.

2.2.3Key Performance Indicators (KPI)

This section describes the KPIs that were used for this purpose comparing the expected with the actual progress that has been achieved during the 3rdyear. Following the evaluation methodology adopted by the OpenScienceLink project, the KPIs have been grouped based on four perspectives: (1) Mission, (2) Resource, (3) Internal Business Processes, and, (4) Learning and Growth. The KPIs for the four perspectives, the anticipated progress for year 3, and the actual progress reported, are presented in the following four tables respectively.

KPI	**Measure**	Expected progress Year 3	Actual progress Year 3
User participation	Number of user registrations in the OpenScienceLink platform	>=1100	73 (but more than 400 unique/anonymous visits in the search tab)
Active user participation	Number of users using the system at least once per month within a 3 month period	>=600	73
Stakeholder participation	Number of institutions (beyond the consortium) involved in the OpenScienceLink pilot operations	>=30	9
Funder participation	Number of research sponsors and/or funding authorities (beyond the consortium) involved in the OpenScienceLink pilot operations	>=5	4

International participation	Number of countries from which the OpenScienceLink Platform has been used at least once	>=30	14
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)	>=25	14
Research domain involvement	Number of Biomedical and Clinical Research areas (such as cardiology, pharmacology, etc.) with researchers registered to the OpenScienceLink platform	>=10	23
Active research domain involvement	Number of biomedical and clinical research areas with active OpenScienceLink users	>=8	12
Open access	Number of indexed open access journal papers and datasets	>=2,000,000	~3,100,000

Table 1: Mission Perspective KPIs for Overall Platform.

KPI	**Measure**		
		Expected progress Year 3	Actual progress Year 3
Funded projects beyond OpenScienceLink	Number of projects in which the OpenScienceLink services, models and tools are used and further developed.	>=11	
Stakeholders with commercial interest	Number of stakeholders having formally expressed commercial interest	>=3	5 (Springer Open, Elsevier, IBM Research, Empolis, ExB)
Journal publications	Number of OpenScienceLink-related scientific journal papers published by consortium members	>=8	15 (spread in two issues)

Blog and website publications	Number of posts on blogs and websites about OpenScienceLink	>=5	12
Conference publications and presentations	Number of OpenScienceLink-related papers, presentations and presence at conferences, workshops and exhibitions	>=13	18
Joint workshops with other projects or related national initiatives	Number of workshops held with other projects or related initiatives	>=5	2
OpenScienceLink website visitors	Number of unique visitors to the OpenScienceLink website	>=400	41,005 (Website and platform together)
Links to OpenScienceLink website	Number of external websites referring to OpenScienceLink website	>=20	47 (obtained via Google)
OpenScienceLink press releases	Number of OpenScienceLink-related press releases published by consortium members	>=10	7
Project dissemination outside Europe	Number of OpenScienceLink-related events to which consortium members participated outside Europe	>=2	3 (actual presentations given via telcos)
Project marketing	Number of OpenScienceLink-related marketing materials material (e.g., leaflets, banners, posters) produced and distributed by consortium members	>=800	250
Targeted contacts and approached potential customers	Number of stakeholders and potential customers (publishers, research organizations, universities) contacted by consortium members	>=25	>40
Reached policy and decision makers	Number of policy and decision makers contacted by consortium members	>=5	3

Table 2: Resource Perspective KPIs for the Overall Platform.

KPI	Measure		
		Expected progress Year 3	Actual progress Year 3
Increase in data paper creation	Increase in number of data papers created per researcher	>=20%	~15%
Creation of Best Practices (BPs) and Blueprints	Number of distinct Best Practices (BPs) and Blueprints Produced	>=8	>20

Table 3: Internal Business Processes KPIs for the Overall Platform.

KPI	Measure		
		Expected progress Year 3	Actual progress Year 3
Involvement of young researchers in the project	Number of PhD students and Postdocs participating in the project	>=10	12
Career advancement of the OSL team	Number of received PhD degrees and relevant habilitations	2	3

Table 4: Learning and Growth Perspective KPIs for the Overall Platform.

2.3 OpenScienceLink Pilots Evaluation

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.

After interviews with stakeholders, the evaluation annotates the following:

1. Pilots 1, 2 and 5 have attracted the most attention, and there are stakeholders interested at this stage to adopt some of their processes.
2. Pilot 3 has great potential. The trend detection mechanism was characterized as very useful.
3. All Pilots combined provide an ecosystem that offers open access to scientific information, from the initial stage of dataset and paper preparation, to access, re-usage and exploitation.
4. The OSL platform processes personal, end-user data, such as the end-users' full name, e-mail address, general fields of interest and employment details, for the performance of its pilot services. The data arefor instance used to personalize the end-user's experience. In order to facilitate research collaboration and evaluation, end-user data is also required. Although the OSL platform's privacy policy is in accordance with the current European data protection framework, future data processing activities will have to take into account the upcoming data protection regulation (once it has been adopted and implemented by the European legislator). The addendum to D3.2already includes data protection compliance guidelinesunder the general data protection regulation.[1]In addition, anonymization remains key. Personal datasets should not be uploaded onto the platform. As datasets are made available for download after they have been reviewed by users of the platform, the guidelines for reviewers should also clearly state that the uploading of personal data is forbidden. Indeed, at the moment, the platform's reviewers, as well as the researchers themselves, are in the best position to detect whether or not an uploaded dataset contains personal data. If they would have any doubts concerning the anonymized nature of datasets, the publication of the reviewed dataset should not be allowed. Furthermore, compromised data sets should be pulled of the platform.
5. With regard to data mining activities performed by the OSL platform, future legal developments should also be taken into account. In a recent communication, the European Commission has recognized that the lack of a clear text- and data mining provision harms the EU's scientific leadership.Legislative proposals are now considered that will allow public interest research organizations to carry out text and data mining of content they have lawful access to, with full legal certainty, for scientific research purposes. Such an exception could benefit the future development of the OSL platform.[2]

6. Finally, the OSL platform should respect the intellectual property rights of third-parties. Therefore, and where necessary, proper authorisation should be obtained from the

[1] OSL, Legal and IPR Management Framework Specification (January 2016).
[2]European Commission, Communication towards a modern, more European copyright framework' COM(2015) 626 final, p. 7-8; available at: http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=12524

relevant right holders when performing services which might infringe upon their rights. This is particularly the case where third-party-content will be re-used. For instance, in the case of 'linking, harvesting, text and data mining'. For pilot services making use of such techniques, proper authorization should be sought.

7. It should be examined how useful could be the collection of a more detailed personal profile of the user beyond name, surname, e-mail and institutional information. However it should be taken intoaccount that the more personal information is collected, the more laborious the platform will be for the users. The additional information could be optional for the user after the registration. This additional information may include:

- Name of user as it appears in publications
- Summary of CV (in a standardized format such as the European format)
- a sector dedicated to the main research field
- Funding during the last 5 years (helps detect conflicts of interest)
- Website
- ORCHID ID, an online identification service created specifically to de-conflict other author ID schemes
- It would be useful if the platform could automatically retrieve list of publications from Pubmed

In the following tables the KPIs per pilot are presented.

2.3.1 Pilot 1: Open-access Data Journals Development

The evaluation annotates the following:

1. In the future, it will remain important to inform the platform end-users, researchers in particular, on the relevant legal framework concerning the open access to scientific information. In this regard, legal guidelines have been formulated as part of WP8 to inform platform end-users on relevant matters concerning IPR and data protection.
2. Uploaded open-access data-sets might contain anonymized data, i.e. datasets pertaining to previously identifiable individuals. License-holders should be prohibited from re-identifying any individual and from using the data to take any measure or decision with regard to the re-identified individuals. Upon detecting that a dataset is compromised, i.e. has become re-identifiable, the license-holder (or any other party) should notify the licensor. Upon notification, the platform should suspend or terminate the accessibility to the data, for instance by removing the file from the platform. Reasonable efforts should also be made to limit the negative effects of compromised datasets, for instance by deleting all or parts of the compromised datasets. This should also include a prominent notice on the platform and website accessed by groups or individuals who are likely to be re-using the data.
3. The last year of the project a very important update of pilot 1 has been added concerning the uploading of new files after reviewing of data papers and the ability of editors and reviewers to access the new revised files but also the original ones and make comparisons

4. A future development should focus on the creation of more detailed metadata in order to achieve better-structured and semantically linked datasets. To this end,the following characteristics of a dataset could be important:
   - the **methodology used** to collect data (e.g. echocardiographic evaluation, Cardiac magnetic resonance, Exercise testing, Blood measurements etc) and the **variables measured in each case** (e.g. for echocardiographic evaluation, Variable 1: Left ventricular internal diameter at diastole (LVIDd), Variable 2: Left ventricular internal diameter at systole (LVIDs), Variable 3: Ejection fraction (EF%) etc) could be retrieved from the submitted datasets
   - **Subjects** used to collect this dataset (humans, animals, cells, species etc.)
   - **Age** of subjects used
   - **Gender** of subjects used

KPI	**Measure**	Expected progress Year 3	Actual progress Year 3
Usage of the data articles	Number of views per month	2,000	4,093
	Number of downloads per month	150	>400
	Citations	10	6
Usage of related datasets	Number of downloads per month	20	17
Usage by the media	Number of articles in popular media, including specialized blogs	3	2
Contributions	Submitted articles per quarter	15	6
Pool of reviewers	Number of researchers that have expressed an interest/ consent	20	12
Interested funders	Number of Research Sponsors and/ or Funding Authorities registered at the OSL platform	2	4
Geographic coverage	Number of countries represented on Editorial Board, authors or reviewers	10	>20
Domain coverage	Number of biomedical and clinical research areas addressed by published data articles	10	~30
Coverage by aggregators	Inclusion in indexing (including ISI[3]) and aggregator services	3	4

[3]Thus providing for getting an impact factor in the future.

Library usage	Inclusion in library catalogues	20	3

Table 5: Mission Perspective KPIs for Pilot 1.

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

Table 6: Resource Perspective KPIs for Pilot 1.

KPI	Measure		
		Expected progress Year3	Actual progress 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	65

Table 7: Internal Business Processes KPIs for Pilot 1.

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

Table 8: Learning and Growth Perspective KPIs for Pilot 1.

2.3.2 Pilot 2: A novel open, semantically-assisted peer review process

The evaluation annotates the following:

1. The platform contains 2 different functionalities for the selection of reviewers. One functionality creates a list of suggested reviewers based on the metadata and the abstract of each submission. The 2nd functionality creates a list of potential reviewers based on the keywords that have been selected by the editor. Both are very useful.
2. During the last year the platform has added the functionality of evaluating reviewers. This tool could be very helpful in order to avoid the high rate of decline of invited reviewers. Evaluation is based at the moment in a score assigned by the editor. It would be very helpful if the platform also included some statistics about the performance of reviewerssuch as number of pending reviews, rate of acceptance of review invitations, mean time to complete review etc.
3. The idea of a open reviewing process would be of added value to the platform and should be considered for future development. For this reason, a social network could be created enabling reviewers to discuss and express opinions on the reviews and the review results. Inside this network, a reviewer will be able to see the comments of the other reviewers and vote in favor or not.
4. During the last year the platform has provided the option to reviewers to write a short comment on the published paper.

KPI	Measure	Expected progress Year 3	Actual progress Year 3
Review request load	Number of review requests sent	400	~80
Reviewer acceptance	Number of accepted review requests	300	39
Submitted reviews load	Number of submitted reviews	260	39
Success of reviewer recommendations	Number of review invitations based on platform suggestions	380	~80
Usage by external venues	Number of venues for which reviews were requested	2	-
Number of Authorships	Number of authors whose publications were put up for review (cumulative)	240	36

Table 9: Mission Perspective KPIs for Pilot 2.

KPI	Measure	Expected progress Year 3	Actual progress Year 3
Speed of the review process	Control group	>30%	-

Table 10: Resource Perspective KPIs for Pilot 2.

KPI	Measure	Expected progress Year 3	Actual progress Year 3
Attraction of more competent reviewers	Questionnaire responses	100%	-
Increased number of reviewers per review	Control group	100%	-

Table 11: Internal Business Processes KPIs for Pilot 2.

KPI	Measure		
		Expected progress Year 3	Actual progress Year 3
Profile growth	Number of new platform profiles created by invited reviewers	120	~15

Table 12: Learning and Growth Perspective KPIs for Pilot 2.

2.3.2 Pilot 3: Services for detection and analysis of research trends

The evaluation annotates the following:

1. During the last year, the platform has updated trends detection that has become more fine grained.
2. For future development of trends detection, important information about research interest could be collected from social media and blogs and not only from analysis of the number of publications.
3. The provision of services for the detection and analysis of research trends may necessitate the re-use of third party content, e.g. through linking, harvesting, text-and data mining techniques. The OSL platform should continue to ascertain the licenses that rest upon the databases they wish to mine. As mentioned in D3.2. Open Access licenses lack uniformity and they may include restrictions on the use of the content to which they pertain. If the license is unclear or ambiguous, data mining activities should not be performed without having obtainedproper authorisation. Hence, it is advisable to seek a license for the application of text and data mining tools to third party databases. Licensing conditions should also be carefully examined: which restrictions are imposed by the relevant right holders on the free exchange of information. If the contents of research papers are to be analysed as well, licenses should not only be obtained for the re-utilization of the data base, but also for the contents of the database. Licenses obtained must also be compatible with the license OSL wishes to grant its users.

KPI	Measure		
		Expected progress Year 3	Actual progress Year 3
Trend searches	Number of executed trend searches	18,000	>3,000

Table 13: Mission Perspective KPIs for Pilot 3.

KPI	Measure		
		Expected progress Year 3	Actual progress Year 3
Acceleration of trend identification	Questionnaire (percentage of users that identified trends faster)	65%	-

Table 14: Resource Perspective KPIs for Pilot 3.

KPI	Measure		
		Expected progress Year 3	Actual progress Year 3
Trend detection F-Measure	F-Measure of hot topics predicted correctly by the platform for the following year	>=30%	~45%

Table 15: Internal Business Processes KPIs for Pilot 3.

KPI	Measure		
		Expected progress Year 3	Actual progress Year 3
Expansion of Biomedical Data Journal through Trend Detection	Number of special issues for Biomedical Data Journal based on detected "hot topics"	2	3

Table 16: Learning and Growth Perspective KPIs for Pilot 3.

2.3.4 Pilot 4: Services for dynamic researchers' collaboration

The evaluation annotates the following:

1. Future development of this pilot should focus on expanding the functionality to be able to suggest potential new collaborations. A crucial factor to consider in potential collaborations is the complementary methodological expertise that could be derived from publications or from user profiles.
2. Theprovision of services for dynamic researchers' collaboration requires the processing of personal data. In particular, data of the OSL platform's end-users will be processed in order to facilitate the collaboration among researchers. The OSL services have been built with respect of the current European data protection framework. Although at the moment the OSL platform's privacy policy is still valid, with regard to future processing activities, it will be necessary to take into account the new Data Protection regulation once it has been adopted by the European legislator. The legal evaluation requirements provided in D8.1 have been altered and added as an addendum to D3.2, taking into account the changes to the data protection framework.

KPI	**Measure**		
		Expected progress Year 3	Actual progress Year 3
User Attraction	Number of Researchers /Scholars having used the pilot services at least once	>=1,000	~70
User Engagement	Number of Researchers /Scholars having used the pilot services more than once	>=800	~50

Table 17: Mission Perspective KPIs for Pilot 4.

KPI	**Measure**		
		Expected progress Year 3	Actual progress Year 3
Number of funded projects *(beyond OpenScienceLink)*	Number of projects in which the pilot models, services and tools are used and further developed	>=2	2
Number of Interested Stakeholders	Number of Stakeholders to whom the pilot has been presented and who have expressed interest	>=2	3

Pilot Visibility: Publications	Number of pilot-related scientific papers published at journals, conferences and workshops	>=5	2
Pilot Visibility: Web Presence	Number of posts at blogs and web sites about the pilot	>=5	7

Table 18: Resource Perspective KPIs for Pilot 4.

KPI	Measure		
		Expected progress Year 3	Actual progress 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	>=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	>=80%	-

Table 19: Internal Business Processes KPIs for Pilot 4.

KPI	Measure		
		Expected progress Year 3	Actual progress 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	>=20	>30

Table 20: Learning and Growth Perspective KPIs for Pilot 4.

2.3.5 Pilot 5: Research evaluation services

The evaluation annotates the following:

1. The **OpenScoreevaluation metric** has been refined and improved based on an updated formula.
2. The **OpenScore** is calculated only for authors in the current version but it would nice for future development to expand openscore in journals and institutions
3. The problem of disambiguation of author names has been partly solved. However, there is place for further improvements in the future in this crucial area.
4. The evaluation of research might necessitate the processing of a researcher's personal data. As indicated under 2.3.5 all future data processing activities will have to take into account the future data protection regulation

KPI	Measure		
		Expected progress Year 3	Actual progress Year3
Stakeholders' Interest	Number of stakeholders (e.g., publishers) indicating interest in the developed evaluation metrics	>=3	3
Metrics Use	Number of entities which have introduced at least one of the evaluation metrics to their evaluation process	>=2	-

Table 21: Mission Perspective KPIs for Pilot 5.

KPI	Measure		
		Expected progress Year 3	Actual progress 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	2

Pilot Visibility: Publications	Number of pilot-related scientific papers published at journals, conferences and workshops	>=3	2
Pilot Visibility: Web Presence	Number of posts at blogs and web sites about the pilot	>=3	7

Table 22: Resource Perspective KPIs for Pilot 5.

KPI	**Measure**		
		Expected progress Year 3	Actual progress Year 3
Acceptability of research evaluation metrics	Percentage of experts indicating that the developed metrics are of value for the research community	>=80%	>90%
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	>=20%	>70%
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	>=10%	-

Table 23: Internal Business Processes KPIs for Pilot 5.

3 Technical Evaluation

In this section, the technical evaluation of the deployed OpenScienceLink platform is conducted. The technical testing of the platform has been conducted according to the ISO Testing Standard ISO 9646. In the following sections, the three classes of tests are defined, and the actual tests with the respective results are presented.

3.1 Technical Evaluation: The Test Cases

The ISO 9646 defines three classes of tests as shown in the following table.

Tests Classes	Description
Basic Tests (BT)	A small number of tests (1 or 2) that are run to actually demonstrate that the platform has been correctly set-up. *It is infeasible to perform other tests if the Basic Tests fail.*
Capability Tests (CT)	A moderate number of tests, the purpose of which is to demonstrate the ability of the platform under test to perform basic sets of functions.
Behaviour Resolution Tests (BER)	A large number of tests that aim to verify that the platform under test behaves correctly under a wide range of situations, determined by various factors.

Table 24: Classes of Tests based on the ISO 9646.

The classification methodology of ISO 9646 is useful, especially towards choosing a fair number of tests of each one of the above classes.

All tests fall in two sub-categories:

Tests Behaviour Types	Description
Successful/Valid Tests (V)	As the name suggests, these tests verify the correct behaviour of the system under test under specific conditions.
Unsuccessful/Invalid Tests (I)	These tests verify that the system under test acts "as it should" under circumstances such as unexpected events, parameters out of range, invalid or unsupported options, negotiation failures and invalid combinations of parameters.

Table 25: Tests Behavior Types.

In this section we will present the tests cases that were applied at the OpenScienceLink platform. Initially we will define some broader categories for the tests cases. Also we will present the structure of each test case defining what we should monitor about each one.

3.1.1 Tests Subclasses

In the following table there are some subclasses of the "main" test classes seen in the previous section. In the first column there is the test class in which each subclass belongs to, while in the last column we can see the types of test (Behaviour Type) that will be performed. These subclasses depict the functionality that will be tested. For each one a few tests will be performed. These tests will be analyzed in the following sections.

Tests Class Name	ID	Tests Subclass Name	ID	Behaviour Type
Basic Tests	BT			
		OpenScienceLink Platform Setup	OPS	V
		Connections check	CC	V
Capability Tests	CT			
		Secure End user Connection	SEC	V
Behavior Resolution Tests	BER			
		CF:Login	CF-L	V-I
		CF:Registration	CF-R	V-I
		CF:Searching	CF-S	V-I
		Pilot 1: Upload Data Set	P1-UDS	V-I
		Pilot 1: Create New Journal Issue	P1-NJI	V-I
		Pilot 1: Dataset Publication	P1-DSF	V
		Pilot 2: Create Review Call	P2-CRC	V-I
		Pilot 2: Upload File(s) For Review	P2-UFR	V-I
		Pilot 2: Get Reviewer Suggestion	P2-GRS	V-I
		Pilot 2: Select and Invite Reviewers	P2-SIR	V-I
		Pilot 2: Managing the Review Process	P2-MRP	V-I
		Pilot 2: Review Submission	P2-RS	V-I
		Pilot 2: Reviewer Rating	P2-RR	V

	Pilot 3: Request for Trend Analysis based on Topic	P3-RTA	V-I
	Pilot 4: Request for Coauthorship Graphs	P4-RFC	V-I
	Pilot 5: Request for Publication Volume based on Topic	P5-RPT	V-I
	Pilot 5: Request for Author Evaluation Score	P5-RAE	V

Table 26: Subcategories and Behavior Tests.

*Notice:*In the above table we should notice that we have specified only Successful/Valid Tests (V) for the subclasses of the Basic Tests and the Capability Tests.

3.1.2 Test Case Identifiers

The identifier of each test case will have the following format:

```
<System_ID>_<Tests_Class_ID>_<Subclass_ID>_<Behaviour_Type_ID>_<nn>
```

In the following table there is a short description about each field of the identifier.

Field	Description
System ID	OpenScienceLink
Tests Class ID	Basic Tests (BT) or Capability Tests (CT) or Behavior Resolution Tests (BER)
Subclass ID	Any class from the subclasses specified in

Tests Class Name	ID	Tests Subclass Name	ID	Behaviour Type
Basic Tests	BT			
		OpenScienceLink Platform Setup	OPS	V
		Connections check	CC	V
Capability Tests	CT			
		Secure End user Connection	SEC	V
Behavior Resolution Tests	BER			
		CF:Login	CF-L	V-I
		CF:Registration	CF-R	V-I
		CF:Searching	CF-S	V-I

	Pilot 1: Upload Data Set	P1-UDS	V-I
	Pilot 1: Create New Journal Issue	P1-NJI	V-I
	Pilot 1: Dataset Publication	P1-DSF	V
	Pilot 2: Create Review Call	P2-CRC	V-I
	Pilot 2: Upload File(s) For Review	P2-UFR	V-I
	Pilot 2: Get Reviewer Suggestion	P2-GRS	V-I
	Pilot 2: Select and Invite Reviewers	P2-SIR	V-I
	Pilot 2: Managing the Review Process	P2-MRP	V-I
	Pilot 2: Review Submission	P2-RS	V-I
	Pilot 2: Reviewer Rating	P2-RR	V
	Pilot 3: Request for Trend Analysis based on Topic	P3-RTA	V-I
	Pilot 4: Request for Coauthorship Graphs	P4-RFC	V-I
	Pilot 5: Request for Publication Volume based on Topic	P5-RPT	V-I
	Pilot 5: Request for Author Evaluation Score	P5-RAE	V
	Table 26		
BehaviourType ID	Successful/Valid (V) or Unsuccessful/Invalid (I)		
Nn	Sequential Number (01 to 99)		

Table 27: The Subfields of the Test Case Identifier.

The identifier described is unique and can provide us with information about the tests class, the subclass and the type in which each test case belongs to.

3.1.3 Test Case Structure

Each test case should contain all the fields mentioned in the table below:

Field	Description
ID	A unique identifier for the test case.
Title	The title of the test case.
Description	A brief description of the test case.
Setup	The prerequisites in order to have access in this test case.
Testing Procedure	The testing procedure that will be used in this test case. Here we should answer in the question: "How we will examine that the system provides the functionality described".
Expected Result	Describe the expected result of the testing procedure.
Result	(Success/Failure)

Table 28: Test Case Structure.

3.2 Basic Tests (BT)

Two basic tests have been specified. Their purpose is to ensure that the platform is up and running and a connection can be established between the application components of the platform.

3.2.1 Valid OpenScienceLink Platform Setup

Test Case ID	OpenScienceLink_BT_OPS_V_01
Test Case Title	Valid OpenScienceLink Platform Setup
Test Case Description	Ensure that all OpenScienceLink components and services are up and running.
Setup	The hardware, software and applications must be identified for every pilot. Administrators must be able to start servers and run their applications.
Testing Procedure	The administrators start their application servers and ensure that all necessary components (hardware and servers) are up and running to start their applications.
Expected Result	All Servers Application components are shown as running.
Test Result	(Success / Failure)

3.2.2 Successful Connection

Test Case ID	OpenScienceLink _BT_CC_V_01

Test Case Title	Successful Connection
Test Case Description	Verify the ability of browsers to establish a connection with all OpenScienceLink entities.
Setup	Internal testing of the connections to the services and resources is made once a request to the platform URL is made.
Testing Procedure	Users visit the OpenScienceLink platform URL, and the connection to the services URLs, databases and resources is teted.
Expected Result	All connections shown a etablished.
Test Result	(Success / Failure)

3.3 Capability Tests (CT)

One capability test has been specified. Their purpose is to ensure that a secure connection can be established between the end user and the OpenScienceLink platform and also between the application components and services.

3.3.1 Secure End User Connection

Test Case ID	OpenScienceLink _CT_SEC_V_01
Test Case Title	Successful Secure End user Connection
Test Case Description	Verify the secure connection of the browsers with the platform servers.
Setup	Browsers connecting to the platform are tested on whether they can establish a secure connection with the platform components.
Testing Procedure	User attempt to connect (visit) the platform URL and the connection is tested on the terms that it is secure and the content (messages) exchanged are encrypted.
Expected Result	A valid secure connection can be established between clients (browsers) and the platform servers.
Test Result	(Success / Failure)

3.4 Behavior Resolution Tests (BER)

A large number of Behaviour Resolution Tests have been specified in order to verify the correct behaviour of the platform. These tests are classified based on the subclasses seen in

Tests Class Name	ID	Tests Subclass Name	ID	Behaviour Type
Basic Tests	BT			
		OpenScienceLink Platform Setup	OPS	V
		Connections check	CC	V
Capability Tests	CT			
		Secure End user Connection	SEC	V
Behavior Resolution Tests	BER			
		CF:Login	CF-L	V-I
		CF:Registration	CF-R	V-I
		CF:Searching	CF-S	V-I
		Pilot 1: Upload Data Set	P1-UDS	V-I
		Pilot 1: Create New Journal Issue	P1-NJI	V-I
		Pilot 1: Dataset Publication	P1-DSF	V
		Pilot 2: Create Review Call	P2-CRC	V-I
		Pilot 2: Upload File(s) For Review	P2-UFR	V-I
		Pilot 2: Get Reviewer Suggestion	P2-GRS	V-I
		Pilot 2: Select and Invite Reviewers	P2-SIR	V-I
		Pilot 2: Managing the Review Process	P2-MRP	V-I
		Pilot 2: Review Submission	P2-RS	V-I
		Pilot 2: Reviewer Rating	P2-RR	V
		Pilot 3: Request for Trend Analysis based on Topic	P3-RTA	V-I
		Pilot 4: Request for Coauthorship Graphs	P4-RFC	V-I
		Pilot 5: Request for Publication Volume based on Topic	P5-RPT	V-I
		Pilot 5: Request for Author Evaluation Score	P5-RAE	V

Table 26.

3.4.1 Common Functionalities

3.4.1.1 CF: Login

3.4.1.1.1 Successful Login

Test Case ID	OpenScienceLink _BER_CF-L_V_01
Test Case Title	Successful Login
Test Case Description	Verify the correct operation of the authentication mechanism and evaluate its usability
Setup	Access to the respective GUI is required
Testing Procedure	The user enters a valid user name and password on the login form (either Client Application or Web area) and presses the "Login" button
Expected Result	Upon successful login, the system shows the main window of the Client Application (for normal users), or the main page of the OpenScienceLink web area (for administrator testers).
Test Result	(Success / Failure)

3.4.1.1.2 Unsuccessful Login – Missing Data

Test Case ID	OpenScienceLink _BER_CF-L_I_02
Test Case Title	Unsuccessful Login – Missing Data
Test Case Description	Identify whether the attempted login corresponds to a registered user.
Setup	A user via a browser attempts to login to the platform. The user provides and e-mail that does not exist, is not registered, or no e-mail.
Testing Procedure	The user tries to login with e-mail address that is unknown to the platform, or with empty credentials.
Expected Result	Unsuccessful login with an error message informing the user.

Test Result	(Success / Failure)

3.4.1.1.3 Unsuccessful Login – Invalid Credentials

Test Case ID	OpenScienceLink _BER_CF-L_I_03
Test Case Title	Unsuccessful Login – Invalid Credentials
Test Case Description	Verify the correct operation of the authentication and authorization mechanism and evaluate its usability.
Setup	Access to the respective GUI is required.
Testing Procedure	The user enters an invalid user name and/or password on the login page and presses the "login" button.
Expected Result	The system returns an error message along with the fields to re-enter the credentials.
Test Result	(Success / Failure)

3.4.1.2 CF: Registration

3.4.1.2.1 Profile Creation

Test Case ID	OpenScienceLink _BER_CF-R_V_01
Test Case Title	Registration and Creation of New Profile
Test Case Description	The user registers first time at the platform, and creates a profile.
Setup	Creation of a new user account and of a user profile in the platform.
Testing Procedure	The user follows the instructions and respective links to create a new user account and profile within the OSL platform.
Expected Result	The user receives a confirmation e-mail that his account has been created, and he should be able to use the credentials to login again, and see his saved profile details.
Test Result	(Success / Failure)

3.4.1.2.2 Profile Editing and Saving

Test Case ID	OpenScienceLink _BER_CF-R_V_02
Test Case Title	Editing and Saving of an Existing User Profile
Test Case Description	Verify the correct operation of the editing and saving of an existing user profile.
Setup	Using an existing account, the ability to edit and save the changes to the existing account is tested.
Testing Procedure	The user logs in to the platform with his existing account credentials, browses to his profile tab, and alters the information. Once the change are saved, the new information should be part of his existing profile, including all changes made.
Expected Result	The saved changes in the profile are stored and visible in any future login attempt. The stored profile is now the new profile of the existing user.
Test Result	(Success / Failure)

3.4.1.3 CF: Searching

3.4.1.3.1 Successful Search for Datasets and Citations

Test Case ID	OpenScienceLink _BER_CF-S_V_01
Test Case Title	Searching for Datasets and Citations with a Valid Query
Test Case Description	Verify the correct operation of the searching of datasets and citations with a query that is expected to return a result set (non-empty set).
Setup	Using the search mechanism of the platform to retrieve relevant datasets and citations using a valid query.
Testing Procedure	The user browses to the search tab of the OSL platform and submits a valid query that is expected to fetch some dataset and/or citation results.
Expected Result	The results matching the query are fetched from the platform databases and indexes and are presented to the user.
Test Result	(Success / Failure)

3.4.1.3.2 Unsuccessful Search for Datasets and Citations

Test Case ID	OpenScienceLink _BER_CF-S_I_02
Test Case Title	Searching for Datasets and Citations with an Invalid Query
Test Case Description	Verify the correct operation of the searching of datasets and citations with a query that is expected to not return any results (empty set).
Setup	Using the search mechanism of the platform to retrieve relevant datasets and citations using an invalid query.
Testing Procedure	The user browses to the search tab of the OSL platform and submits an invalid query that is not expected to fetch any datasets or citation results.
Expected Result	The empty set is returned and the user is informed that there are no results for the given query.
Test Result	(Success / Failure)

3.4.2 Pilot 1

3.4.2.1 P1:Upload Data Set

3.4.2.1.1 Upload Data Set Successfully

Test Case ID	OpenScienceLink _BER_P1-UDS_V_01
Test Case Title	Upload Data Set Successfully
Test Case Description	Verify that a non-empty dataset that has not yet been submitted to the platform is successfully uploaded.
Setup	Access to the respective GUI; the user must be logged in as author.
Testing Procedure	The user enters the “Upload Dataset” page, fills in all the necessary fields, uploads a zip file with the dataset or provides an external URL and presses “Save Changes”.
Expected Result	Newly uploaded dataset is visible to the author.
Test Result	(Success / Failure)

3.4.2.1.2 Upload Data Set Failed – Data Set Already Exists

Test Case ID	OpenScienceLink _BER_ P1-UDS _I_02
Test Case Title	Upload Data Set Failed – Data Set Already Exists
Test Case Description	Verify that if a user tries to submit a dataset that has already been submitted, the submission process fails.
Setup	Access to the respective GUI; the user must be logged in as author.
Testing Procedure	The user enters the "Upload Dataset" page, fills in all the necessary fields, provided a zip file with the dataset or an external URL and presses "Save Changes". The dataset with such name/description or URL has already been uploaded.
Expected Result	The submission process is not performed; the user gets the message that the data set already exists.
Test Result	(Success / Failure)

3.4.2.1.3 Upload Data Set Failed – Missing data

Test Case ID	OpenScienceLink_BER_ P1-UDS _I_03
Test Case Title	Upload Data Set Failed – Missing Data
Test Case Description	Verify that if a user tries to submit a dataset without providing the actual data, the submission process fails.
Setup	Access to the respective GUI; the user must be logged in as author.
Testing Procedure	The user enters the "Upload Dataset" page, fills in all the necessary fields, but does not provide a zip file with the dataset or an external URL and presses "Save Changes".
Expected Result	The submission process is not performed; the user gets the message that the data is missing.
Test Result	(Success / Failure)

3.4.2.2 P1:Create New Journal Issue

3.4.2.2.1 New Journal Issue Created Successfully

Test Case ID	OpenScienceLink_BER_ P1-NJI

	_V_01
Test Case Title	New Journal Issue Created Successfully
Test Case Description	Verify that a new issue of the journal can be successfully created by an editor.
Setup	The user is logged in as editor.
Testing Procedure	The user goes to "Editor Activities" tab and presses "Add Issue". Then (s)he selects the volume, fills in the required fields and presses "Save changes".
Expected Result	A newly created issue should appear in the list of available issues in the "Editor Activities" tab.
Test Result	(Success / Failure)

3.4.2.2.2 New Journal Issue Creation Failed – Issue Already Exists

Test Case ID	OpenScienceLink_BER_ P1-NJI _I_02
Test Case Title	New Journal Issue Creation Failed – Issue Already Exists
Test Case Description	Verify that an issue of the journal with a specific title and deadlines cannot be created twice.
Setup	The user is logged in as editor.
Testing Procedure	The user goes to "Editor Activities" tab and presses "Add Issue". Then (s)he selects the volume, fills in the title and deadline fields with the values of already existing issue, and presses "Save changes".
Expected Result	The creation of a new issue is not completed, a user gets a message that such issue already exists.
Test Result	(Success / Failure)

3.4.2.2.3 Edit Existing Journal Issue

Test Case ID	OpenScienceLink_BER_ P1-NJI _V_03
Test Case Title	Operations on a journal issue are done successfully

Test Case Description	Verify that a user with author privileges can view, edit and delete and existing journal issue that he has created
Setup	The user is logged in as editor and is the creator of the journal issue.
Testing Procedure	The user goes to "Editor Activities" tab and presses "Add Issue" and performs the following operations on journal issues (by clicking on respective thumbnails): "delete the issue", "edit the issue", "view the issue", "view datasets submitted for this issue".
Expected Result	All four operations can be successfully performed.
Test Result	(Success / Failure)

3.4.2.3 P1: Dataset Publication

3.4.2.3.1 Dataset Published Successfully

Test Case ID	OpenScienceLink_BER_ P1-DSF _V_01
Test Case Title	Dataset Published Successfully
Test Case Description	Verify that a new dataset can be successfully assigned a DOI and published by an editor.
Setup	The user is logged in as editor. The dataset has been reviewed and accepted.
Testing Procedure	The user goes to "Editor Activities" tab, views the datasets submitted for a specific issue and presses "Publish the dataset by giving it a DOI". Then (s)he types the DOI and presses "Save changes".
Expected Result	A published dataset should be indexed and available to the Platform users.
Test Result	(Success / Failure)

3.4.3 Pilot 2

3.4.3.1 P2: Create Review Call

3.4.3.1.1 Call Creation Successful

Test Case ID	OpenScienceLink _BER_P2-CRC_V_01
Test Case Title	Call Creation Successful
Test Case Description	Verify the correct operation of the review call creation
Setup	The user must have logged in to the platform with editor privileges.
Testing Procedure	The user creates a review call by correctly filling the form that can be accessed from the „editor activities“ tab of the platform.
Expected Result	Newly created review call is displayed and open for submissions.
Test Result	(Success / Failure)

3.4.3.1.2 Call Creation Failed – Missing Data

Test Case ID	OpenScienceLink _BER_P2-CRC_I_02
Test Case Title	Call Creation Failed – Missing Data
Test Case Description	Verify the correct response of the service when required information has not been provided.
Setup	The user must have logged in to the platform with editor privileges.
Testing Procedure	The user attempts to create a review call by filling the form that can be accessed from the „editor activities“ tab of the platform, but leaves out required information (e.g., the venue for the call).
Expected Result	Presentation of an error message to the user indicating that required data has not been provided.
Test Result	(Success / Failure)

3.4.3.2 P2: Upload Files for Review

3.4.3.2.1 File Upload Successful

Test Case ID	OpenScienceLink _BER_P2-UFR_V_01
Test Case Title	File Upload Successful
Test Case Description	Verify the correct operation of the file upload functionality.
Setup	The user must have logged in to the platform with editor privileges.
Testing Procedure	The user clicks the „upload“ button on the „editor activities“ tab of the platform, correctly fills the form and selects a file for upload.
Expected Result	The file is stored on the server and the review process can proceed with the next stage.
Test Result	(Success / Failure)

3.4.3.2.2 File Upload Failed – Missing Data

Test Case ID	OpenScienceLink _BER_P2-UFR_I_02
Test Case Title	File Upload Failed – Missing Data
Test Case Description	Verify the correct response of the service when required data has not been provided.
Setup	The user must have logged in to the platform with editor privileges.
Testing Procedure	The user clicks the „upload“ button on the „editor activities“ tab of the platform, leaves out required information while filling the form and selects a file for upload.
Expected Result	Presentation of an error message to the user indicating that required data has not been provided.
Test Result	(Success / Failure)

3.4.3.3 P2: Get Reviewer Suggestions

3.4.3.3.1 Get Reviewer Suggestions Successfully

Test Case ID	OpenScienceLink _BER_P2-GRS_V_01
Test Case Title	Get Reviewer Suggestions Successfully
Test Case Description	Verify that the system correctly retrieves reviewer suggestions when appropriate keywords are provided.
Setup	The user must have logged in to the platform with editor privileges.
Testing Procedure	The user adds one or more closely connected terms describing a research topic and requests reviewer suggestions.
Expected Result	The system presents a list of appropriate potential reviewers.
Test Result	(Success / Failure)

3.4.3.3.2 Get Reviewer Suggestions Failed – No Appropriate Reviewers

Test Case ID	OpenScienceLink _BER_ P2-GRS _I_02
Test Case Title	Get Reviewer Suggestions Failed – No Appropriate Reviewers
Test Case Description	Verify the correct response of the service when an inappropriate set of keywords is selected.
Setup	The user must have logged in to the platform with editor privileges.
Testing Procedure	The user adds a relatively large set of very diverse terms describing a research topic and requests reviewer suggestions.
Expected Result	The system presents an error message to the user indicating that no reviewer can be found for the entered set of terms. It recommends to the user to remove some terms with low importance.
Test Result	(Success / Failure)

3.4.3.4 P2: Select and Invite Reviewers

3.4.3.4.1 Select and Invite Suggested Reviewers

Test Case ID	OpenScienceLink _BER_ P2-SIR_V_01
Test Case Title	Select and Invite Suggested Reviewers
Test Case Description	Verify that the selection and invitation of suggested reviewers works as planned.
Setup	The user must have logged in to the platform with editor privileges, and a list of reviewer suggestions must have been retrieved successfully.
Testing Procedure	The user selects one or more reviewers from the list of suggestions and clicks „Invite reviewers“.
Expected Result	The system starts the process for inviting reviewers by presenting the invitation form for each reviewer who has been selected by the user.
Test Result	(Success / Failure)

3.4.3.4.2 Invite Reviewers Chosen by the User

Test Case ID	OpenScienceLink _BER_ P2-SIR_I_02
Test Case Title	Invite Reviewers Chosen by the User
Test Case Description	Verify that the user can invite reviewers not on the list of suggestions.
Setup	The user must have logged in to the platform with editor privileges, and a list of reviewer suggestions must have been retrieved (list may be empty).
Testing Procedure	The user adds one or more reviewers to the list of suggestions by entering their name and e-mail, selects them and clicks „Invite reviewers“.
Expected Result	The system starts the process for inviting reviewers presenting the invitation form for each reviewer who has been selected by the user in succession.
Test Result	(Success / Failure)

3.4.3.4.3 Complete the Invitation

Test Case ID	OpenScienceLink _BER_ P2-SIR_V_03
Test Case Title	Complete the Invitation
Test Case Description	Verify that the system sends e-mails to the selected reviewers after the user has filled all invitation forms.
Setup	The user must have logged in to the platform with editor privileges.
Testing Procedure	For testing purposes, the user adds him- or herself as a reviewer and completes the invitation process.
Expected Result	The system sends an e-mail invitation to the user containing the text that was entered while filling the invitation form as well as a link to the review form. The editor's overview table for the invited reviewers shows that the user has been invited as a reviewer.
Test Result	(Success / Failure)

3.4.3.5 P2: Managing the Review Process

3.4.3.5.1 Managing the Review Process: Request Accepted

Test Case ID	OpenScienceLink _BER_ P2-MRP_V_01
Test Case Title	Managing the Review Process: Request Accepted
Test Case Description	Verify that the system allows invited reviewers to accept the invitation and displays this information to the inviting editor.
Setup	**OpenScienceLink _BER_ P2-SIR_V_03** has been completed successfully.
Testing Procedure	The user opens the link sent by e-mail and accepts the review invitation.
Expected Result	The user's “Reviewer Activities” overview now contains a link to the review form. The editor's overview table for the invited reviewers shows that the user accepted the invitation.
Test Result	(Success / Failure)

3.4.3.5.2 Managing the Review Process: Request Denied

Test Case ID	OpenScienceLink _BER_ P2-MRP_V_02
Test Case Title	Managing the Review Process: Request Denied
Test Case Description	Verify that the system allows invited reviewers to reject the invitation and displays this information to the inviting editor.
Setup	**OpenScienceLink _BER_ P2-SIR_V_03** has been completed successfully.
Testing Procedure	The user opens the link sent by e-mail and rejects the review invitation.
Expected Result	The editor's overview table for the invited reviewers shows that the user rejected the invitation.
Test Result	(Success / Failure)

3.4.3.5.3 Managing the Review Process: Send E-Mail Reminder

Test Case ID	OpenScienceLink _BER_ P2-MPR_V_04
Test Case Title	Managing the Review Process: Send E-Mail Reminder
Test Case Description	Verify that the system allows editors to send reminders to invited reviewers.
Setup	**OpenScienceLink _BER_ P2-SIR_V_03** has been completed successfully.
Testing Procedure	The editor uses the platform's “send e-mail reminder” functionality.
Expected Result	The system sends an e-mail reminder to the user.
Test Result	(Success / Failure)

3.4.3.6 P2: Review Submission

3.4.3.6.1 Review Submission Successful

Test Case ID	OpenScienceLink _BER_ P2-RS_V_01
Test Case Title	Review Submission Successful
Test Case Description	Verify that the system allows invited reviewers to submit the correctly filled out review form and editors to access the review.
Setup	**OpenScienceLink _BER_ P2-MPR_V_01** has been completed successfully.
Testing Procedure	The user fills out all required fields of the review form and submits the review.
Expected Result	Presentation of a confirmation message to the user indicating that the review has been submitted successfully. The editor's overview table for the invited reviewers shows that the user submitted the review and now contains a link to the review.
Test Result	(Success / Failure)

3.4.3.6.2 Review Submission Failed – Required Input Missing

Test Case ID	OpenScienceLink _BER_ P2-RS_I_02
Test Case Title	Review Submission Failed – Required Input Missing
Test Case Description	Verify that the system gives the correct error message to invited reviewers if they attempt to submit the review form without filling all required fields.
Setup	**OpenScienceLink _BER_ P2-MPR_V_01** has been completed successfully.
Testing Procedure	The user attempts to submit the review without filling out all required fields.
Expected Result	Presentation of an error message to the user indicating that required data has not been provided.
Test Result	(Success / Failure)

3.4.3.7 P2: Reviewer Rating

3.4.3.7.1 Reviewer Rated Successfully

Test Case ID	OpenScienceLink_BER_ P2-RR _V_01
Test Case Title	Reviewer Rated Successfully
Test Case Description	Verify that a reviewer can be successfully assigned a rating after completion of the review of an article/dataset.
Setup	The user is logged in as editor. The article/dataset has been reviewed by the reviewer.
Testing Procedure	The user goes to “Editor Activities” tab, and views the reviewer invitations for a specific article/dataset. For a completed review of the article/dataset by a reviewer s(he) presses “Rate Reviewer”. Then (s)he rates the reviewer in a scale from 1 to 5 and presses “Submit”.
Expected Result	The rating for this reviewer is stored in the platform. The platform can calculate the reviewer’s overall rating based on the stored ratings.
Test Result	(Success / Failure)

3.4.3.7.2 Reviewer Rating Presented Successfully

Test Case ID	OpenScienceLink_BER_ P2-RR _V_02
Test Case Title	Reviewer Rating Presented Successfully
Test Case Description	Verify that the rating of a reviewer that has been already rated is presented to the editor before inviting reviewers.
Setup	The user is logged in as editor and wishes to invite reviewers for a specific issue. The suggested reviewer is also a user of the OpenScienceLink Platform.
Testing Procedure	The user goes to "Editor Activities" tab, and selects to invite reviewers for a specific article/dataset. After adding any desired keywords s(he) presses "Find Reviewers" and is presented with a list of relevant reviewers from the OSL Platforms or PubMed/MEDLINE Authors.
Expected Result	In the relevant reviewers list the reviewer's overall rating (scale 1 to 5) must appear for each reviewer who is a user of the OpenScienceLink platform. If a reviewer has not been rated yet, the rating appears blank (unrated).
Test Result	(Success / Failure)

3.4.4 Pilot 3

3.4.4.1 P3: Request for Trend Analysis based on Topic

3.4.4.1.1 Request for Visualizing the Trend of a Given Topic Successfully

Test Case ID	OpenScienceLink _BER_P3-RTA_V_01
Test Case Title	Request for Visualizing the Trend of a Given Topic Successfully
Test Case Description	Verify the correct operation of the request for topic trend analysis visualization
Test Case Purpose	To verify that the trend of existing topics are presented to the user through plots
Setup	The user needs to have logged in the platform.
Testing Procedure	The user enters one or more terms describing the research topic for which they would like to be presented with the trend analysis plots.
Expected Result	Presentation of the trend analysis plot for the research topic which the user has described through the query terms.

Test Result	(Success / Failure)

3.4.4.1.2 Request for Visualizing the Trend of a Given Topic - Missing or Incomplete Data

Test Case ID	OpenScienceLink_BER_P3-RTA_I_02
Test Case Title	Request for Visualizing the Trend of a Given Topic - Missing or Incomplete Data
Test Case Description	Verify the correct response of the service when no terms, or not supported terms describing a topic have been provided.
Test Case Purpose	To verify the correct response of the service when no terms or not supported terms describing a topic have been provided.
Setup	The user needs to have logged in the platform.
Testing Procedure	The user requests to be presented with the trend analysis plot without filling in any data, or filling terms that are not supported or indexed.
Expected Result	Presentation of an error message to the user indicating that no data, or unsupported data have been provided.
Test Result	(Success / Failure)

3.4.5 Pilot 4

3.4.5.1 P4: Request for Co-authorship Graphs

3.4.5.1.1 Request for Coauthorship Graphs Successfully

Test Case ID	OpenScienceLink _BER_P4-RFC_V_01
Test Case Title	Request for Coauthorship Graphs Successfully
Test Case Description	Verify the correct operation of the request for coauthorship graphs
Test Case Purpose	To verify that existing coauthorships are presented to the user through graphs.
Setup	The user needs to have logged in the platform.
Testing Procedure	The user enters one or more terms describing the research topic or the name of the scientist for whom they would like to be presented with the

	coauthorship graphs.
Expected Result	Presentation of the coauthorship graphs for the research topic which the user has described through the terms or for the scientist whose name they have entered.
Test Result	(Success / Failure)

3.4.5.1.2 Request for Coauthorship Graphs Failed – Missing data

Test Case ID	OpenScienceLink_BER_P4-RFC_I_02
Test Case Title	Request for Coauthorship Graphs Failed – Missing data
Test Case Description	Verify the correct response of the service when no terms describing a topic or no scientist name have been provided.
Test Case Purpose	To verify the correct response of the service when no terms describing a topic or no scientist name have been provided.
Setup	The user needs to have logged in the platform.
Testing Procedure	The user requests to be presented with the coauthorship graphs without filling in any data.
Expected Result	Presentation of an error message to the user indicating that no data has been provided.
Test Result	(Success / Failure)

3.4.5.1.3 Request for Coauthorship Graphs Failed – Inappropriate data

Test Case ID	OpenScienceLink_BER_P4-RFC_I_03
Test Case Title	Request for Coauthorship Graphs Failed – Inappropriate data
Test Case Description	Verify the correct response of the service when inappropriate data have been provided.
Test Case Purpose	To verify the correct response of the service when inappropriate data have been provided.
Setup	The user needs to have logged in the platform.
Testing	The user requests to be presented with the coauthorship graphs after filling

Procedure	in inappropriate data (i.e., terms which do not describe a biomedical topic or comprise the name of a scientist).
Expected Result	Presentation of an error message to the user indicating that inappropriate data has been provided.
Test Result	(Success / Failure)

3.4.6 Pilot 5

3.4.6.1 P5:Request for Publication Volume based on Topic

3.4.6.1.1 Request for Publication Volume based on Topic Successfully

Test Case ID	OpenScienceLink _BER_P5-RPT_V_01
Test Case Title	Request for Publication Volume based on Topic Successfully
Test Case Description	Verify the correct operation of the request for publication volume based on Topic
Test Case Purpose	To verify the correct operation of the request for publication volume based on Topic
Setup	The user needs to have logged in the platform.
Testing Procedure	The user enters one or more terms describing the research topic for which they would like to receive evaluation.
Expected Result	Presentation of a series of ranked lists of Country, City, Journals, Authors based on the number of publications for the specific topic.
Test Result	(Success / Failure)

3.4.6.1.2 Request for Publication Volume based on Topic Failed – Missing data

Test Case ID	OpenScienceLink_BER_P5-RPT_I_02
Test Case Title	Request for Publication Volume based on Topic Failed – Missing data
Test Case Description	Verify the correct response of the service when no terms describing a topic have been provided.
Test Case	To verify the correct response of the service when no terms describing a

Purpose	topic have been provided.
Setup	The user needs to have logged in the platform.
Testing Procedure	The user requests to be presented with the ranked lists of Country, City, Journals, Authors based on the number of publications without entering any terms describing a topic.
Expected Result	Presentation of an error message to the user indicating that no data has been provided.
Test Result	(Success / Failure)

3.4.6.1.3 Request for Publication Volume based on Topic Failed – Inappropriate data

Test Case ID	OpenScienceLink_BER_P5-RPT_I_03
Test Case Title	Request for Publication Volume based on Topic Failed – Inappropriate data
Test Case Description	Verify the correct response of the service when inappropriate data have been provided.
Test Case Purpose	To verify the correct response of the service when inappropriate data have been provided.
Setup	The user needs to have logged in the platform.
Testing Procedure	The user requests to be presented with the ranked lists of Country, City, Journals, Authors based on the number of publications and has entered inappropriate terms which do not describe a biomedical topic.
Expected Result	Presentation of an error message to the user indicating that inappropriate data has been provided.
Test Result	(Success / Failure)

3.4.6.2 P5:Request for Author Evaluation Score

3.4.6.2.1 Request for Author Evaluation Score Successfully

Test Case ID	OpenScienceLink _BER_P5-RPT_V_01
Test Case Title	Request for Evaluation Score of an Author
Test Case	Verify the correct operation of the request for evaluation score for an

Description	Author
Test Case Purpose	To verify the correct operation of the request for evaluation score for an Author
Setup	The user needs to have logged in the platform and have performed a request for publication volume based on a topic
Testing Procedure	The platform automatically requests for an evaluation score for each of the Authors that are displayed in the ranked list of Authors as a result of a request for publication volume based on a topic.
Expected Result	Presentation of a numerical value ranging from 0 to 100 for each of the Authors in the ranked list of Authors.
Test Result	(Success / Failure)

3.5 Technical Evaluation Results

The following table summarizes the technical evaluation results. As the table shows, all of the contacted tests were successful, but, in 5 cases, the error messages should be added or edited (5 I tests), Overall, this evaluation and testing shows that the first release of the platform is working in a technically satisfactory manner.

Test Case Title	Result
OpenScienceLink_BT_OPS_V_01	Success
OpenScienceLink _BT_CC_V_01	Success
OpenScienceLink _CT_SEC_V_01	Success
OpenScienceLink _BER_CF-L_V_01	Success
OpenScienceLink _BER_CF-L_I_02	Success
OpenScienceLink _BER_CF-L_I_03	Success
OpenScienceLink _BER_CF-R_V_01	Success
OpenScienceLink _BER_CF-R_V_02	Success
OpenScienceLink _BER_CF-S_V_01	Success
OpenScienceLink _BER_CF-S_I_02	Success
OpenScienceLink _BER_P1-UDS_V_01	Success
OpenScienceLink _BER_ P1-UDS _I_02	Success
OpenScienceLink_BER_ P1-UDS _I_03	Success
OpenScienceLink_BER_ P1-NJI _V_01	Success
OpenScienceLink_BER_ P1-NJI _I_02	Success
OpenScienceLink_BER_ P1-NJI _V_03	Success
OpenScienceLink_BER_ P1-DSF _V_01	Success
OpenScienceLink _BER_P2-CRC_V_01	Success
OpenScienceLink _BER_P2-CRC_I_02	Success
OpenScienceLink _BER_P2-UFR_V_01	Success
OpenScienceLink _BER_P2-UFR_I_02	Success
OpenScienceLink _BER_P2-GRS_V_01	Success
OpenScienceLink _BER_ P2-GRS _I_02	Success
OpenScienceLink _BER_ P2-SIR_V_01	Success
OpenScienceLink _BER_ P2-SIR_I_02	Success
OpenScienceLink _BER_ P2-SIR_V_03	Success
OpenScienceLink _BER_ P2-MRP_V_01	Success
OpenScienceLink _BER_ P2-MRP_V_02	Success
OpenScienceLink _BER_ P2-MPR_V_04	Success

OpenScienceLink _BER_ P2-RS_V_01	Success
OpenScienceLink _BER_ P2-RS_I_02	Success
OpenScienceLink_BER_ P2-RR _V_01	Success
OpenScienceLink_BER_ P2-RR _V_02	Success
OpenScienceLink _BER_P3-RTA_V_01	Success
OpenScienceLink_BER_P3-RTA_I_02	Success (although no message is prompted)
OpenScienceLink _BER_P4-RFC_V_01	Success
OpenScienceLink _BER_P4-RFC_I_02	Success (although no message is prompted)
OpenScienceLink _BER_P4-RFC_I_03	Success (although no message is prompted)
OpenScienceLink _BER_P5-RPT_V_01	Success
OpenScienceLink _BER_P5-RPT_I_02	Success (although no message is prompted)
OpenScienceLink _BER_P5-RPT_I_03	Success (although no message is prompted)
OpenScienceLink_BER_P5-RAE_V_01	Success

Table 29: Summary of Technical Evaluation Results.

4 Financial Evaluation

4.1 Overall OSL Platform Financial Evaluation

4.1.1 The overall open access landscape

A growth trend has been observed for the open access (OA) publication market over the past years. According to (Laakso, Welling, Bukvova, Nyman, & Björk, 2011) open access publications production has increased more than 10 times within the past decade both in terms of articles and journals. In fact, their study indicates that OA is already in its consolidation period. Numbers are quite indicative. The directory of open access journals (DOAJ)already includes more than 9800 journals and 1.5 million articles published from over 120 countries. OpenDOAR (Directory of Open Access Repositories)has more than 2500 repositories listed, ROAR (Registry of Open Access Repositories)presents information about more than 2,500 repositories, while the ROARMAP (Registry of Open Access Repositories Mandatory Archiving Policies)includes more than 440 open access mandate policies. The Directory of Open Access Books (DOAB) includes more than 1,645 Academic peer-reviewed books from 55 publishers. Moreover, the BASE (Bielefeld Academic Search Engine) search engine, which focuses on academic open access web resources has already indexed more than 56 million documents and 2700 sources. HighWire Press by Stanford Universitycomprises an archive of over 2.3 million free full-text provided articles. In the biomedical domain, in particular, PMC (PubMed Central)has already indexed more than 734,000 OA articles with more than 1,200 journals providing their content with immediate free access and over 970 journals offering all of their articles openly accessible.

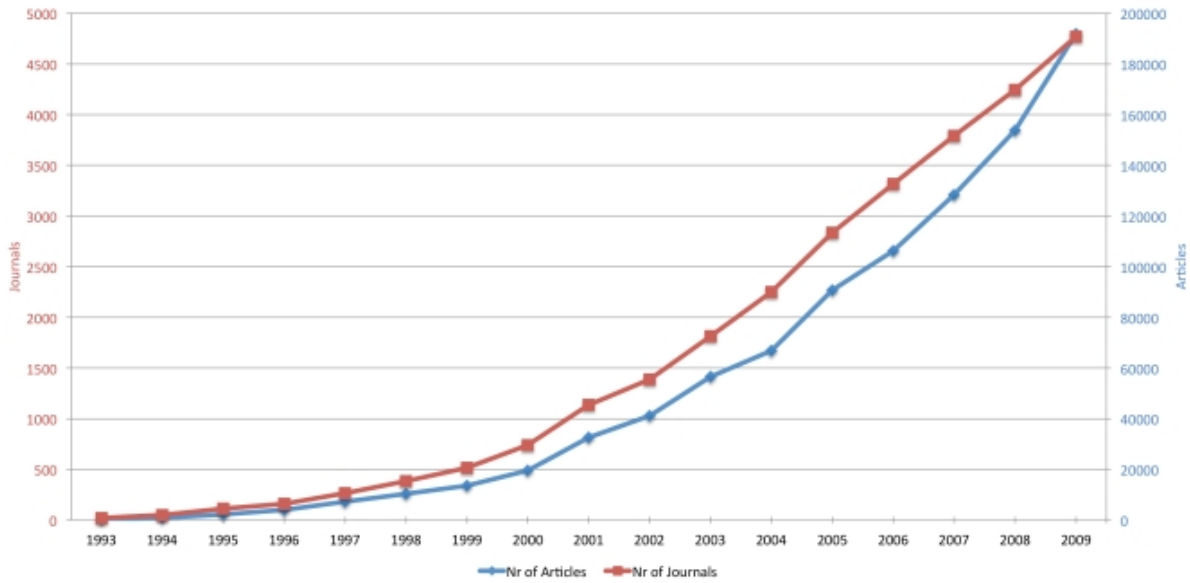


Figure 6: Open access publishing between 1993 and 2009.

A study in (Laakso & Björk, 2012)shows that although initially open access publishing has been flourishing in the world of universities and scientific societies, commercial publishers have become key actors on the OA scene, with an almost tenfold increase in the number of OA articles being published within a 6 years period (2005-2011).

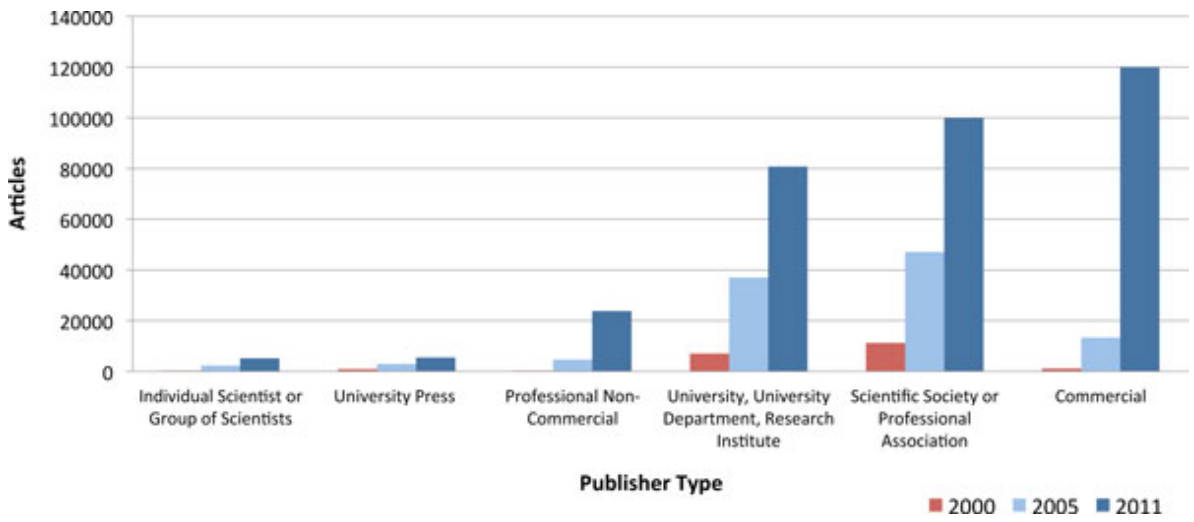


Figure 7: Different Publisher Types for Open Access Articles.

Given that profit comprises a fundamental concept in the commercial world and publication of research includes a series of costs, reconciliation of publishing fees for OA journals has been attempted through research and subscription funding. From this perspective, there are two main models for OA provision; green and gold OA(Harnad, et al., 2004). In Green OA, scientists publish their findings through institutional or central repositories, or self-archiving (i.e., by placing their peer-reviewed post-prints on OA web pages). In fact, research institutions and funders, including the European Commission and Harvard, mandate their scientists to make their research findings publicly available in order to maximise the impact of the scientific work conducted. In Gold OA, publishing is done through OA journals, such as BioMed Central and PLoS, which may either allow publications for free or set a publishing fee to authors or their funders. Gradually more thorough classifications are introduced, such as diamond OA referring to publishing in journals which do not charge any fees to authors or readers. Currently, one third of OA journals charge publishing fees, while others receive institutional, governmental, or third-party funding(Kurata, Morioka, Yokoi, & Matsubayashi, 2013).

4.1.2 Open Access and Biomedical Research

As presented in Figure 8, the volume of open access publications has tremendously increased for the major scientific disciplines, with the biomedicine domain showing a growth of more than 16 times in number of OA articles published between 2000 and 2011. In fact, according to a study in 2013, OA has shown tremendous growth in the biomedical field with more than 50% of OA articles coming for it(Kurata, Morioka, Yokoi, & Matsubayashi, 2013).

One of the main topics for debate over OA publishing focuses on its assumed negative effect on the quality of scientific publishing. However, recent findings(Laakso & Björk, 2012)show that OA journals, and in the medical and health domain in particular, which are indexed in Web of Science and/or Scopus and are published in the four largest publishing countries show the same scientific impact and quality with subscription journals. Interestingly, OA journals which pose article processing charges in order to fund publishing are on average cited more than other OA journals.

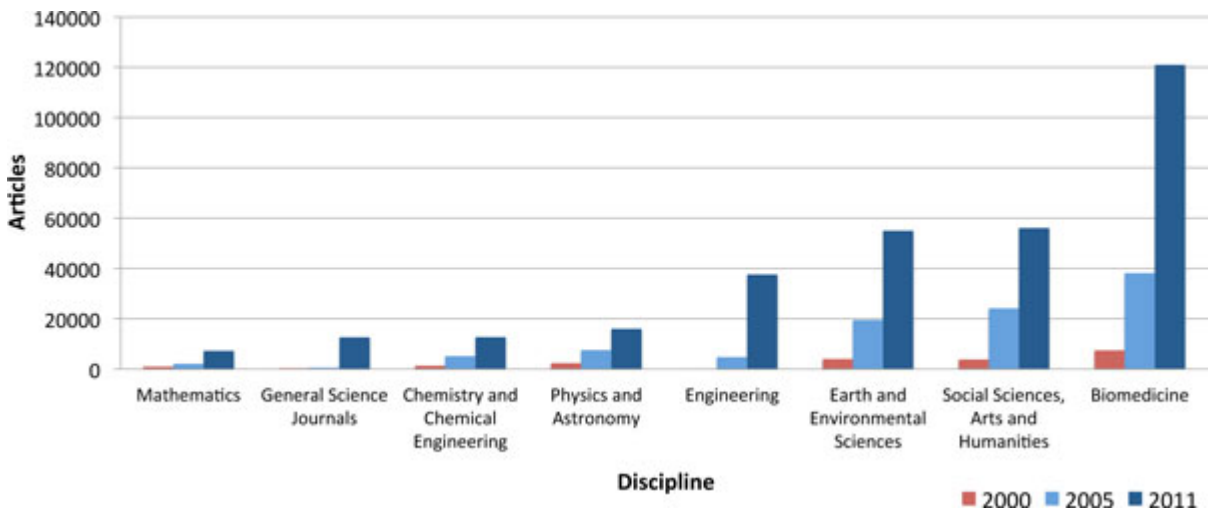


Figure 8: Open Access Articles across different disciplines.

4.2 Pilot 1:Open-access Data journals development

4.2.1 Analysis of Different Business Models and Competitors

To meet the cost of publishing, authors who publish open-access are asked to pay an open access fee or article-processing charge (APC) per published paper. This cost is usually covered by research funds from the departments that contribute to this work.

To partially remove this burden from the individual authors, some publishers have created different ***Membership programs***. A Membership Program enables academic and research institutions, societies, groups, funders and corporations to actively support open access in scholarly publishing, and help ensure the most widespread dissemination of the work published by their researchers or members. Depending on the type of Membership, Member institutions cover some or all of the publication cost for their individual researchers when they submit to a certain publisher.

Three different types of Membership have been described :

1. **Prepay Membership**
   Enables an institution to cover the whole cost of publishing with no additional fees paid by their authors.
2. **Shared Support Membership**
   The cost of publishing is split between the institution and author.
3. **Supporter Membership**
   Members pay a flat rate annual Membership fee based on the number of science and medical researchers and graduate students at their institution. A 15% discount on the article-processing charge (APC) is given when publishing in the journals.

The number of funding research organizations that adopt policies to promote open-access to scientific information. These organizations could be a source of funding for the Biomedical data Journal. The following table provides information on funding organizations from around Europe and the open access policies they have in place.

Organization	Country	OA policy	OA Funding
Fonds zur Foerderung der wissenschaftlichen Forschung (FWF)	Austria	Yes	Yes
Research Foundation Flanders (FWO)	Belgium	Yes	Yes
Centre national de la recherche scientifique (CNRS)	France	Yes	Yes
INSERM (Institut national de la sante et de la recherche medicale)	France	Yes	Yes
Deutsche Forschungsgemeinschaft (DFG)	Germany	Yes	Yes
Max Planck Society	Germany	Yes	Yes
Hungarian Scientific Research Fund (OTKA)	Hungary	Yes	Yes
Science Foundation Ireland (SFI)	Ireland	Yes	No
ConsiglioNazionale delle Ricerche (CNR)	Italy	Yes	Yes
Telethon	Italy	Yes	Yes
Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO)	Netherlands	No	Yes
Consejo Superior de Invesigaciones Científicas (CSIC)	Spain	No	Yes
RiksbankensJubileumsfond	Sweden	Yes	Yes
Swedish Foundation for Strategic Research	Sweden	No	Yes
Swedish Research Council	Sweden	No	Yes
Swiss National Science Foundation (SNF)	Switzerland	No	Yes
Breakthrough Breast Cancer	UK	Yes	Yes

Organization	Country	OA policy	OA Funding
British Heart Foundation (BHF)	UK	Yes	Yes
Cancer Research UK	UK	Yes	Yes
Research Council UK (RCUK)	UK	Yes	Yes
Wellcome Trust	UK	Yes	Yes

Table 30: European Open-Access Funders.

The following table provides information about competitor journals for BMDJ.

Competitor	Brief Description	Relation to OpenScienceLink / Potential Business Models
Scientific Data Journal (Nature Group)	Starting May 2014, this data journal will allow for the publishing, discovery and reusing of research data. http://www.nature.com/scientificdata/about/	Different scientific focus for the data
Data in Brief (Elsevier)	The journal "welcomes submissions that describe data from all research areas". It is indexed by DOAJ, Science Direct, and PubMed Central. It provides indication of impact via "Altmetrics", illustrating the engagement of social media communities with articles in Data in Briefbased on the amount of activity from Twitter, Facebook, science blogs, mainstream news, and other sources captured by Altmetric.com for each publication in the last six months. Volume 1 has been published in December 2014 with 18 data papers. By September 2015 it has published four volumes (one volume per quarter: vol. 12 with 12; vol. 3 with 43; and vol. 43 with 102 data papers). About ¾ of all data papers are from the fields of Biochemistry, Genetics and Molecular Biology; Pharmacology, Toxicology and Pharmaceutical Science; Immunology and Microbiology. The article processing fee is 500 USD, with a 50 % discount by the end of 2015. http://www.journals.elsevier.com/data-in-brief/	Direct competitor, with substantial emphasis on biomedical and life sciences
Linked Open Data from University of Münster (Germany) LODUM	LODUM aims at connecting different data sources across the 15 faculties and departments at the University of Münster through the implementation of Open Access and Linked Open Data principles across the university. http://data.uni-muenster.de/	Potential content source
OpenAire EU project	The FP7 project OpenAIRE aimed at offering the means to promote and realize the widespread adoption of the Open Access Policy by aggregating research publications which comprise European funded research output. OpenAIREplus, being its successor, further aims at linking this data to the	Potential Content source Planning to sign a MoU

Competitor	Brief Description	Relation to OpenScienceLink / Potential Business Models
	accompanying research and project information, datasets and author information. Apart from the data, it also provides a series of functionalities such as statistics and reporting tools which can be useful to project managers. http://www.openaire.eu/	
re3data	It is a global registry of research data repositories from different academic disciplines which is funded by the German Research Foundation (DFG). http://www.re3data.org/	Potential Content source
myExperiment	It comprises a public repository of scientific workflows which is currently supported by three European Commission 7th Framework Programme (FP7) projects: BioVeL, SCAP and the Wf4Ever Project and the e-Research SouthandmyGridEPSRC Platform grants. http://www.myexperiment.org/	Potential Content source
Open PHACTS	The Open PHACTS Discovery Platform integrates pharmacological data from a variety of information sources and offers tools and services for applying questions on this data with an aim to facilitate pharmacological research. http://www.openphacts.org	Potential Content source
Biodiversity Data Journal	The first issue of the *Biodiversity Data Journal*, featuring 27 articles, appeared in its final version in September 2013. BDJ is published by Pensoft Ltd., Bulgaria. http://biodiversitydatajournal.com	Potential Content source, if the OpenScienceLink domain broadens. Potential publisher and editor who could benefit from the data journal management and review services and additionally the trend mining and scientometrics services.
Geoscience Data Journal	At the end of November 2013, five articles appear on the website of the *Geoscience Data Journal*, including the lead editorial article [20]. The journal is published by Wiley. http://onlinelibrary.wiley.com/journal/10.1002/%28ISSN%292049-6060	
Journal of Open Archaeology Data	The *Journal of Open Archaeology Data* is published by Ubiquity Press. The first volume with nine articles appeared in 2012. As of end November 2013, volume 2 features two data articles. http://openarchaeologydata.metajnl.com	
Journal of Open Psychology Data	The *Journal of Open Psychology Data* is also published by Ubiquity Press. By the end of November 2013 the journal website provides access to two articles, one of which is the editorial article. http://openpsychologydata.metajnl.com	
Earth System Science Data	*Earth System Science Data* (ESSD) is an international, interdisciplinary journal for the publication of articles on original research data (sets), furthering the reuse of high-quality data of benefit to Earth system sciences. The editors encourage submissions on original data or data collections which are of sufficient quality and have potential to contribute to these aims. The journal maintains sections for regular-length articles, brief communications (e.g. on additions to data sets) and commentaries, as well as review articles and special issues. http://earth-system-science-data.net/	
Journal of	The *Journal of Chemical & Engineering Data* is a monthly journal	

Competitor	Brief Description	Relation to OpenScienceLink / Potential Business Models
Chemical and Engineering Data	devoted to the publication of experimental data and the evaluation and prediction of property values. It is the only American Chemical Society journal primarily concerned with articles containing experimental data on the physical, thermodynamic, and transport properties of welldefined materials including complex mixtures of known compositions and systems of environmental and biochemical interest. http://pubs.acs.org/journal/jceaax	
Journal of Physical and Chemical Research Data	The*Journal of Physical and Chemical Reference Data*is published by the American Institute of Physics (AIP) for the National Institute of Standards and Technology (NIST). The objective of the Journal is to provide critically evaluated physical and chemical property data, fully documented as to the original sources and the criteria used for evaluation, preferably with uncertainty analysis. Critical reviews of measurement techniques may also be included if they shed light on the accuracy of available data in a technical area. Papers reporting correlations of data or estimation methods are acceptable only if they are based on critical data evaluation and if they produce "reference data"—the best available values for the relevant properties. http://jpcrd.aip.org/	
International Journal of Robotics Research	A leading peer-reviewed journal in its field for more than two decades, the *International Journal of Robotics Research* (IJRR) was the first scholarly publication on robotics research. IJRR offers incisive and thought-provoking original research papers and articles, perceptive reviews, and lively editorials on ground-breaking trends issues, technical developments, and theories in robotics by the outstanding scholars and practitioners in the field. The Journal covers more than just narrow technical advances-it embraces a wide variety of topics. IJRR also publishes high quality, peer reviewed datasets and multimedia extensions alongside articles. This journal is a member of the Committee on Publication Ethics (COPE). http://ijr.sagepub.com/	
F1000 Research	*F1000Research* is an Open Science publishing platform offering immediate publication of posters, slides and articles with no editorial bias. All articles benefit from transparent peer review and the inclusion of all source data. http://f1000research.com	
Ecological Archives - Data Papers	*Ecological Archives* publishes materials that are supplemental to articles that appear in the ESA journals (Ecology, Ecological Applications, Ecological Monographs, Ecosphere, Ecosystem Health and Sustainability and Bulletin of the Ecological Society of America), as well as peer-reviewed data papers with abstracts published in the printed journals. Ecological Archives is published in digital, Internet-accessible form. http://esapubs.org/archive/default.htm	
GigaScience	It is a journal which publishes 'big-data' studies from the entire spectrum of life and biomedical sciences. It is with BioMed Central and supported by BGI – a Chinese non-profit organisation which claims to be the largest genomics	Potential Content source, Publisher and Editor potentially

Competitor	Brief Description	Relation to OpenScienceLink / Potential Business Models
	organisation. It is indexed in the Directory of Open Access Journals (DOAJ), PubMed and PubMed Central.	interested primarily in data journal management and review services and additionally in the trend mining and scientometrics services.
Genomics Data	It is an open access journal published by Elsevier which covers all aspects of genome-scale analysis, including nucleic acids analysis, microarray and next-gen sequencing data and all organisms.	
Journal of Open Public Health Data	It is a data journal which is published by Ubiquity Press. Its main focus is on data with reusability potential or which can be used for research validation purposes.	
Scientific Data	It is a data journal to be published by Nature Publishing Group which currently focuses on datasets from the life, biomedical and environmental science communities, but is intended to cover a broad range of scientific disciplines. It has been scheduled to launch in May 2014. Datasets are not hosted by the publisher. Instead community-recognised data repositories are expected to store them, if available, or other repositories such as the Dryad.	

Table 31: Pilot 1 Competitors.

4.2.2 Insights for the formulation of realistic business and sustainability plans

A. Spendings per year

	Activity	Rough cost estimate
A0	Policies, business process, legal issues	OSL
A1	Website and presence in social networks Initial development, software and functionality upgrades, expanding the presence in social networks	2,000
A2	Journal management 1/2 position, bachelor's degree, working knowledge of English, some understanding of biomedical issues (2,500 Euro per month, including social and other insurance, including the insurance paid by the employing company) = 12 months x 1,250 Euro per month (article processing, e.g. page setting, is included here)	15,000
A3	Printing and mailing 4 issues x 1,500 Euro (4 colours cover, the usual issue is with black and white body; when necessary, individual pages /galley/ way be printed in colour; printout – between 300 and 500 copies; format – A4)	64,000
A4	Advertising the journal (online, in specialised magazines, at relevant conferences, etc.)	2,000

	Sub-total	25,000
A5	Overhead, 20 % Office space & equipment, consumables, communications, web hosting, etc.	5,000
	Total	**30,000**
A6	Return of Investments, 20 %	6,000
A7	Required annual revenues	**36,000**

Table 32: Spendings for Pilot 1.

B. Possible revenues

	Sources	**Required revenues**
B1	Sale of printed copies including by subscription Euro 20 per sold copy (above packaging, posting, and transaction costs), 100 copies sold of each issue = 4 x 100 x 20	8,000
B2	Advertising in the journal	2,000
B3	Direct support by an agency or programme supporting open access	2,000
B4	Author's fees (institutional membership may provide stability and increase predictability, but is not expected to increase revenues, since it will lead to waiving authors' fees) 4 issues x 15 articles per issue in average = 60 articles **Fee of 400 Euro per article** (or an equivalent amount for an institutional membership) Remark: Fees for publications by members of the Editorial Board and 'active' reviewers may be waived. Hence, this calculation is based only on the number of articles for which authors are requested to pay the fee.	24,000
	Total	**36,000**

Table 33: Possible Revenues for Pilot 1.

Possibilities to reduce costs:

Increase the efficiency of journal management and journal preparation

1. Assign a person with lower qualification to manage the journal (not desirable).
2. Seek synergies by assigning the same person to manage three or four journals.
3. Request that authors use a dedicated writing tool (that provides the articles in print-ready form).

4. Milder form of the above requirement – provide templates in commonly used software tools and request that authors use the one they are used to.
5. Request that articles be written in a language that does not require copy-editing.
6. Provide paid services for formatting submissions to journal requirements (in case a contribution is not formatted according to journal requirements)
7. Provide paid copy-editing services for cases when a contribution is not written with acceptable quality of language.

Selected examples of author's fees for publication in open access journals:

Journal	At launch	Regular	Remark
Biodiversity Data Journal, Pensoft	0	"a minimal fee ... that anyone can afford"	Manuscripts must be written in their own 'writing tool,' or from integrated external platforms, such as Scratchpads or GBIF Integrated Publishing Toolkit
Geoscience Data Journal, Wiley	n/a	$1,500	
GigaScience (~BioMed Central)	0	0	Thanks to the support by BGI
Journal of Open Public Health Data, Ubiquity Press	0	0	"covered by funding"
Genomics Data, Elsevier	$ 100	$ 500	Additional charges if formatting and copy editing is necessary
Scientific Data, Nature Publishing Group	-30%	$ 630/700	Depending on the type of Creative Commons License
Journal of Defense Management, OMICS Group	$ 1,300	$ 1,300	Do not seem to have considerable number of contributors. Members of the Editorial Board publish free of charge

Table 34: Examples of author fees for publication in OA journals.

<u>Increase revenue predictability and direct support</u>

- Seek support by funding agencies
- Seek support by academic libraries, foundations, corporations, etc.

4.3 Pilot 2: A novel open, semantically-assisted peer review process

4.3.1 Analysis of different business models and competitors

Competitor	Brief Description	Business models
EasyChair	EasyChair is described in Deliverable 9.4.3. (Table 3). http://www.easychair.org/	EasyChair supports three different kinds of licenses (free, professional and executive). There are restrictions on the number of free licenses that can be issued to a single conference. Professional conference organisers and societies or companies organizing a number of conferences are potential customers. Prices for all non-free licenses are based on the number of submissions
FluidReview	FluidReview is described in Deliverable 9.4.3. (Table 3). http://fluidreview.com	FluidReview has flexible pricing options that can meet the needs of any organization, big or small. A free trial period is provided for testing. A special team works with the customer to determine which plan and schedule is best suited for his requirements. FluidReview requires an annual commitment. After one year, the customer may cancel his subscription or continue with the service. Flexible payment schedules are provided.
Public Knowledge Project - Open Journal Systems	OJS is described in Deliverable 9.4.3. (Table 3).	All of the events (discussion forums, lectures, seminars, workshops, and symposia on topical and timely issues from every discipline) are **free** and open to the public, students, faculty, staff and schools. OJS is based on the support of our private and academic sponsors.
ArnetMiner	ArnetMiner is described in Deliverable 9.4.3. (Table 3). http://arnetminer.org/reviewer-home	Arnetminer follows the the commercial open source business model. Because the open source product is available for free, potential customers can download, install, and use the product without getting in touch with the commercial firm behind the product. At the same time, the firm can track via download registration and

Competitor	Brief Description	Business models
		community forum activities who is actually using the product. A lead analysis can then determine which of these users might be potential customers. More often than not, however, the firm will wait until a non-paying user steps forward and asks for a sales contact to purchase any of the services outlined in the revenue generation section. Thus, leads emerge from the existing user community, either voluntarily or by analysis.
OpenConf	OpenConf is described in Deliverable 9.4.3. (Table 3). http://www.openconf.com/	It is a peer-review management system, used by thousands of events in over 100 countries, that facilitates the management of conferences, workshops, and symposia, yet is flexible enough that it also powers journals, grants, books, and competitions. OpenConf is also multilingual, with translations for author and reviewer interfaces included for over a dozen languages. OpenConf is available in multiple editions to meet various needs, and may either be licensed for use on one's own server or from a managed hosting service.
Peerage of Science	It is described in Deliverable 9.4.3. (Table 3). https://www.peerageofscience.org	For Authors and Reviewers, the submission and peer review process in Peerage of Science is free of any charges. Subscribing journals, however, have different publishing models. Open-access journals usually require fees from authors upon acceptance; these fees must be stated to Authors in the publishing offer sent via Peerage of Science, but Peerage of Science is not collecting any fees itself.
Academic Karma	Academic Karma is described in Deliverable 9.4.3. (Table 3). http://academickarma.org/	Authors access faster, higher quality and more transparent peer review outside the journal system, for free. Editors make access to peer-

Competitor	Brief Description	Business models
		review freely available to all, bringing down costs of open-access publishing. Reviewers maintain the quality and reproducibility of the open access scientific literature whiledemonstrating expertise in their field.
The Winnower	Winnower is described in Deliverable 9.4.3. (Table 3). https://thewinnower.com/	Winnower is an open access online scholarly publishing platform that employs open post-publication peer review which is free for all members and works in four basic steps: Submission, Review, Revision and Archival.

Table 35: Pilot 2 Competitors and business models

4.3.2 Targeted customers and stakeholders.

Targeted customers and stakeholders for pilot 2 have been analysed in Deliverable 9.4.3. (Table 9 and 10).

4.4 Pilot 3: Services for detection and analysis of research trends

4.4.1 Analysis of different business models and competitors

Competitor	Brief Description	Business model
TechCast	TechCast is described in Deliverable 9.4.3. (Table 4). http://www.techcast.org/	TechCast is an academic research project that depends on membership subscriptions to support its research. It offers professional subscriptions for 1, 2 and 3 years, as well as student and academic group subscriptions. Trial membership is also available for limited access. Subscriptions include 2 options 1. Professional Subscription for General Managers, Technology Officers, CIOs, Strategic Planners, Technology Transfer, Business Development, and others in business and governments who

Competitor	Brief Description	Business model
		need to stay abreast and plan for strategic change 2. Student and Academic Group Subscription for business and other student or academic groups of 10 or more for teaching or academic research purposes
The Millennium Project	**The Millennium Project** is described in Deliverable 9.4.3. (Table 4). http://www.millennium-project.org/index.html	The Project is sustainable with the important financial support of all kinds of sponsors such as • Army Environmental Policy Institute, • Azerbaijan State Economic University • Deloitte &Touche LLP, Cleveland, Ohio • Foundation for the Future, Bellevue, Washington • General Motors, Warren, Michigan • The Hershey Company • Hughes Space and Communications, • Kuwait Petroleum Corporation • Ministry of Communications, Republic of Azerbaijan • Monsanto Company, St. Louis, Missouri • Motorola Corporation, Schaumburg, Illinois • ·Rockefeller Foundation • Shell International • UNESCO, Paris, France • United Nations Development Programme, • United Nations University, Tokyo, Japan • U.S. Department of Energy, Washington, D.C. (2000–03)
ArnetMiner	Arnetminer is described in Deliverable 9.4.3. (Table 4). http://arnetminer.org/	Arnetminer follows the the commercial open source business model. In this model, the product is available for free, potential customers can download, install, and use the product without getting in touch with the commercial firm behind the product. At the same time, the firm can track via download registration and community forum activities who is actually using the product. A lead analysis can then determine which of these users might be potential customers. More often than not, however, the firm will wait until a non-paying user steps forward and asks for a sales contact to purchase any of the services outlined in the revenue generation section. Thus, leads

Competitor	Brief Description	Business model
		emerge from the existing user community, either voluntarily or by analysis.
TrendMiner Project	It is described in Deliverable 9.4.3. (Table 4). http://www.trendminer-project.eu/index.php/obj	TrendMiner is an EU-funded project
Google Trends	Google Trends is described in Deliverable 9.4.3. (Table 4). http://www.google.com/trends/	Google Trends follows the the commercial open source business model. Some of the functionalities are available for free, potential customers can use the product without getting in touch with the commercial firm behind the product. Registered users can have access to more functionalities. Analysis can determine which of the users might be potential customers.
Institute For The Future	IFTF is described in Deliverable 9.4.3. (Table 4). http://www.iftf.org/	IFTF is an independent, non-profit research institute IFTF is sustainable with the important financial support of academic institutions and private sponsors.
Essential Science Indicators	ESI is described in Deliverable 9.4.3. (Table 4). http://wokinfo.com/products_tools/analytical/essentialscienceindicators/	ESI depends on membership subscriptions offering a single subscription model or an academic/research institution subscription. Registered users need to sign in to have access to a web-based platform. It includes 10 year rolling coverage, updated every two months.

Table 36: Pilot 3 Competitors and business models

4.4.2 Insights for the formulation of realistic business and sustainability plans

Trend analysis is according to many different sources the base for decision making today and especially in the future. The availability and – more – important the accessibility of big data volumes ask for tools to interpret available data. The big financial potential lies behind the analysis of trends in order to be able to create products when they are needed. Companies being able to deliver custom tailored products when they are needed most will have a unique selling point and will therefore be better than competitors. As a good example a US based company GenomeQuest do trend analysis in the area of Bioinformatics – specialized in gene sequences in patents. The company's revenue has doubled every year and is now at around 10 million US dollars. Such a simple business model not even providing advanced statistical and/or semantic algorithms allows for such a tremendous growth.

The technologies developed in Open Science Link will go far beyond what players like GenomeQuest do. We foresee a CAGR of 15 to 30 % in the area of trend analysis. In 2016 the global marked will have reached a state where especially Europe should be stable positioned before global M&A deals start. Our "product" will by then be is in fully developed state and beyond state of the art.

To estimate expected revenues would be too early and depends also on marked approaches.

Targeted customers and stakeholders for pilot 3 have been analysed in Deliverable 9.4.3. (Table 11).

4.5 Pilot 4: Services for Dynamic Researchers' Collaboration

4.5.1 Analysis of different business models and competitors

Competitor	Brief Description	Business model
Research Gate	ResearchGate is described in Deliverable 9.4.3. (Table 5). https://www.researchgate.net	ResearchGate is a for-profit enterprise. They have had two rounds of funding and have investors that have previously been involved with Facebook, LinkedIn and PayPal Researchgate has raised another investment round of $35M with money from Microsoft and Tenaya Capital, Dragoneer Investment Group and Thrive Capital. . Over the longer haul, the firm hopes to charge companies and universities for using it to advertise jobs, and to operate a marketplace for laboratory materials. It has no plans to post other advertising, though, nor to charge its users directly.
ArnetMiner	ArnetMiner is described in Deliverable 9.4.3. (Table 5). http://arnetminer.org/	Arnetminer follows the the commercial open source business model. In this model, the product is available for free, potential customers can download, install, and use the product without getting in touch with the commercial firm behind the product. At the same time, the firm can track via download registration and community forum activities who is actually using the product. A lead analysis can then determine which of these users might be potential customers. More often than not, however, the firm will wait until a non-paying user steps forward and asks for a sales contact to purchase any of the services outlined in the revenue generation section. Thus, leads emerge from the existing user community, either voluntarily or by analysis.
MyScienceWork	MyScienceWork is described in Deliverable 9.4.3. (Table 5). http://www.myscience work.com/#the-research-network	The business model depends on subscriptions to support its sustainability. Trial membership is also available for limited access.Subscriptions are examined on a case by case basis according to the size and needs of the customer

Competitor	Brief Description	Business model
Academia.edu	**Academia.edu** is described in Deliverable 9.4.3. (Table 5). https://www.academia.edu	The service is free of charge to its over 2 million users and does not offer any premium services or institutional memberships. However, CEO Richard Priceexpressed his belief that the business will generate revenue in the future by providing 'trending research data to R&D institutions that can improve the quality of their decisions by 10-20%.'
Methodspace	Methodspace is described in Deliverable 9.4.3. (Table 5). http://www.methodspace.com/	Methodspace is a non-profit free online network of researchers, resources and debates.
Mendeley	**Mendeley** is described in Deliverable 9.4.3. (Table 5). http://www.mendeley.com/	The platform serves two interrelated customer segments with distinct offers. The individual researcher is served with a freemium model, users can upgrade their cloud space for a monthly fee starting at 4,99 USD. In addition, since May 2012 Mendeley partners with information management services provider SWETS for the Mendeley Institutional Edition which offers real-time analytics to libraries for a fee.
Microsoft Academic Search	It is described in Deliverable 9.4.3. (Table 5). http://academic.research.microsoft.com	Microsoft Academic Search services are provided by Microsoft to the public free of charge. The user must complete the registration process by providing with current, complete and accurate information as prompted by the applicable registration form. For purposes of maintaining and improving Microsoft Academic Search services, Microsoft may record activities at Microsoft Academic Search site and make use of certain information.
Biowebspin	It is described in Deliverable 9.4.3. (Table 5).	Biowebspin identifies itself as a leading professional network in Life Sciences, connecting academia and industry. Biowebspin is the platform to find and connect with the right partners, and the place to network, work, and look up information thanks to smart tools and boards.In beta test from late 2012 to early 2013, Biowebspin is now in the top 3 of the most visited websites worldwide in Life Sciences. Biowebspin SA was created in 2013 in Switzerland (capital: CHF 550,000).
LinkedIn	It is described in Deliverable 9.4.3. (Table 5).	LinkedIn is publicly held and has a diversified business model with revenues coming from member subscriptions, advertising sales, and talent solutions

Competitor	Brief Description	Business model
DIRECT2Experts	It is described in Deliverable 9.4.3. (Table 5).	The DIRECT2 Experts network is open to all biomedical institutions, is a pilot project facilitated by the Research Networking Working Group of the NIH-supported Clinical & Translational Science Award (CTSA)
BioMedUSA	BioMedUSA is described in Deliverable 9.4.3. (Table 5).	The open access service is entirely free of charge to all scientists and administrators at non-profit research institutions as well as at commercial biomedical organizations.

Table 37: Pilot 4 Competitors and business models.

4.5.2 Insights for the formulation of realistic business and sustainability plans

The aforementioned players are a vital sign that collaboration can't be estimated high enough. As a strong trend in sciences, subjects get more and more complex and can not be investigated by one genius brain alone. The average number of authors of high-end publications (Nature, Science, Cell etc.) increases constantly. It is of crucial interest to provide tools for collaboration beyond todays habits: basically sending unstructured emails to possible collaborators. Data must be integrated, automatically analysed and a machine should be able to draw conclusions and suggest hypothesis to teams. In Open Science Link we partly aim for such new ways and generally speaking we see a huge market. One challengeable fact is that Research Gate raised 30 million € from The Gates Foundation.

Targeted customers and stakeholders for pilot 4 have been analysed in Deliverable 9.4.3. (Table 12).

4.6 Pilot 5:Research evaluation services

4.6.1 Analysis of different business models and competitors

Competitor	Brief Description	Business model
Thomson Reuters Web of Science	Web of Science® is described in Deliverable 9.4.3. (Table 6). http://thomsonreuters.com/web-of-science/	**Thomson Reuters** depends on membership subscriptions offering a single subscription model or an academic/research institution subscription. Registered users need to sign in to have access to a web-based platform.
Thomson Reuters InCites	*InCites*™ is described in Deliverable 9.4.3. (Table 6). http://researchanalytics.thomsonreuters.com/incites/	**Thomson Reuters** depends on membership subscriptions offering a single subscription model or an academic/research institution subscription. Registered users need to

Competitor	Brief Description	Business model
		sign in to have access to a web-based platform.
ResearchGate	It is described in Deliverable 9.4.3. (Table 6). https://www.researchgate.net/	ResearchGate is a for-profit enterprise. They have had two rounds of funding and have investors that have previously been involved with Facebook, LinkedIn and PayPal Researchgate has raised another investment round of $35M with money from Microsoft and Tenaya Capital, Dragoneer Investment Group and Thrive Capital. . Over the longer haul, the firm hopes to charge companies and universities for using it to advertise jobs, and to operate a marketplace for laboratory materials. It has no plans to post other advertising, though, nor to charge its users directly.
ArnetMiner	ArnetMiner is described in Deliverable 9.4.3. (Table 6). http://arnetminer.org/	Arnetminer follows the the commercial open source business model. In this model, the product is available for free, potential customers can download, install, and use the product without getting in touch with the commercial firm behind the product. At the same time, the firm can track via download registration and community forum activities who is actually using the product. A lead analysis can then determine which of these users might be potential customers. More often than not, however, the firm will wait until a non-paying user steps forward and asks for a sales contact to purchase any of the services outlined in the revenue generation section. Thus, leads emerge from the existing user community, either voluntarily or by analysis.
GoogleScholar Metrics	Google Scholar Metrics is described in Deliverable 9.4.3. (Table 6). http://scholar.google.lt	It presents evaluations of journals based on popular evaluation metrics. The OpenScienceLink models and evaluation services could be feeding the platform enriching the provided evaluation.
Harzing's Publish or Perish	Harzing's Publish or Perish is described in Deliverable 9.4.3. (Table 6). http://www.harzing.com/pop.htm	Its sustainability depends on fund raising from academia and research institutions
Microsoft Academic Search	Microsoft Academic Search is described in Deliverable 9.4.3. (Table 6).	Microsoft Academic Search services are provided by Microsoft to the public free of charge. The user must complete the registration process by providing with current, complete and accurate information as prompted by the applicable registration form. For purposes of maintaining and improving Microsoft Academic Search services,

Competitor	Brief Description	Business model
		Microsoft may record activities at Microsoft Academic Search site and make use of certain information.
Scopus	Scopus is described in Deliverable 9.4.3. (Table 6). http://www.elsevier.com/online-tools/scopus	Due to high demand, scopus can only provide pricing information to the representative of the institution who would decide on purchasing a subscription. Institutional access is required to fully benefit from Scopus.
Altmetric	It is described in Deliverable 9.4.3. (Table 6). http://www.altmetric.com	It is a relatively small company with focus on engineering and domain knowledge. Started by wining into Elsevier's Apps for Science competition. They took on additional investment from Digital Science, and are still a part of the group today. Users now include some of the world's leading journals, funders and institutions.

Table 38: Pilot 5 Competitors and business models.

Targeted customers and stakeholders for pilot 5 have been analysed in Deliverable 9.4.3. (Table 13).

4.6.2 Insights for the formulation of realistic business and sustainability plans

Research evaluation is as important as trend analysis and can partly be based on or profit from it. As stated above, trend analysis and trend detection are key when it comes to be first mover. The demand for reliable, scientific correct measures is obvious. Doing trend analysis on mediocre designed indicators is rather senseless. So the first need is to create reliable indicators, which go beyond the above mentioned competitors. Open Science Link does exactly this. Having them at hand the next issue which can be addressed is flexibility which should range from researcher, to research group, to department, to University, to city, county and finally state. Also our multidimensional approach to focus for example on bioinformatics and being able to profile e.g. Europe against North America sets OSL apart from existing technologies.

All in all it can be named realistic, that our technologies bring added value to customers. Thereby the business model can be high jacked but extended to more flexibility, more accuracy and more semantic cross links for addressing meaning instead of "words". Thinkable is selling single topics in a yearly subscription (e.g. Bioinformatics, Europe, 2015). Single individuals may get it cheap where Institutions get a higher priced product and so on.

Seeing the rough number from Thomson Reuters the market seems to be huge and fast growing. We estimate also here a CAGR of 10-20 %.

5 Summary and Conclusions

This report serves as a year 3evaluationof the OpenScienceLinkproject from the perspective of interested stakeholders, technical achievements and business plans.

Based on stakeholders views, among the most important achievements in this period has been the publication of the first datapapers in Biomedical Data Journal, and the development of new version of the OpenScienceLink platform.With regards to the issues that should attract more attention in the future, the three major points were: the exploitation, the attraction of more users of the platform and knowledge transfer.Stakeholders have also provided a number of suggestions/criticisms that are reported in this document and will be taken into account for improvement of the platform in the future. Based on previously defined Key Performance Indicators(KPIs) the actual progress reported here shows that most of the goals were achieved even if the initial plan of expected progress could be characterized as very ambitious.

Concerning the technical evaluation, almost all of the contacted tests were successful, and this mature version of the platform was shown to work technically in a very satisfactory manner.

Finally, from a financial point of view, we evaluated the overall market into which the platform and its services are positioned, the competitors and the business models that they use. A comparison of the OpenScienceLink pilot services with these products has been conducted in order to unveil advantages of the OSL platform over competitors. A detailed analysis of business plans has been included in a separate deliverable D9.3.

6 References

Andronikou, V., Tagarev, T., Tagareva, P., Pantos, C., Mourouzis, I., Iervasi, G., . . . Alvers, M. R. (2013). *D9.4.1: Sustainability Plans.* OpenScienceLink Consortium.

Harnad, S., Brody, T., Vallieres, F., Carr, L., Hitchcock, S., & Gingras, Y. (2004). The access/impact problem and the green and gold roads to open access. *Ser Rev 30*, 310.

Kurata, K., Morioka, T., Yokoi, K., & Matsubayashi, M. (2013). Remarkable growth of open access in the biomedical field: analysis of PubMed articles from 2006 to 2010. *PLoS ONE*, 8:e60925.

Laakso, M., & Björk, B.-C. (2012). Anatomy of open access publishing: a study of longitudinal development and internal structure. *BMC Medicine 10(1)*.

Laakso, M., Welling, P., Bukvova, H., Nyman, L., & Björk, B.-C. (2011). The Development of Open Access Journal Publishing from 1993 to 2009. *PLoS ONE 6(6): e20961*.

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