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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 2nd year version of the OSL platform covering different perspectives. First, we have collected and analyzed feedback from all stakeholders of the OpenScienceLink ecosystem, including researchers, scholars, universities, research organizations, research sponsors, funding agencies, funding authorities, open-access publishers and the media. The evaluation was based on several modalities including questionnaires, interviews, satisfaction surveys and other tools that were specified as part of the project's evaluation framework. At a second level, we present evaluation of the project's platform and services from a 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 evaluation of 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 sustainability plans. 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 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 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 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 and launching 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 1 designates the worst score, and the value of 5 the top (best) score. Overall, the internal



evaluation via the questionnaire shows that within the second year the progress was satisfactory.

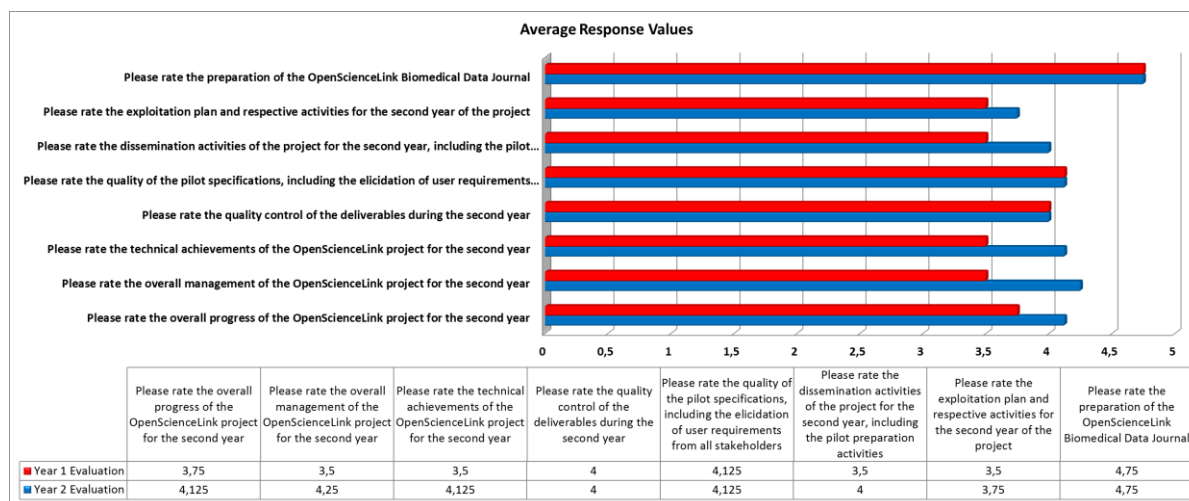


Figure 1: Summary of numeric questionnaire response values.

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

The results of these two questionnaires are summarized in the following figures. As the results suggest, among the most important achievements in the second year of the project has been the development of the pilot specifications, the preparation and launching of the Biomedical Data Journal, and the actual release of the OpenScienceLink platform (publicly available at: <http://opensciencelink.org>). In parallel, the participants to the questionnaire suggested that the dissemination efforts of the project and its results, the OpenScienceLink platform, and way resources are mobilized are among the most important aspects that can be improved.

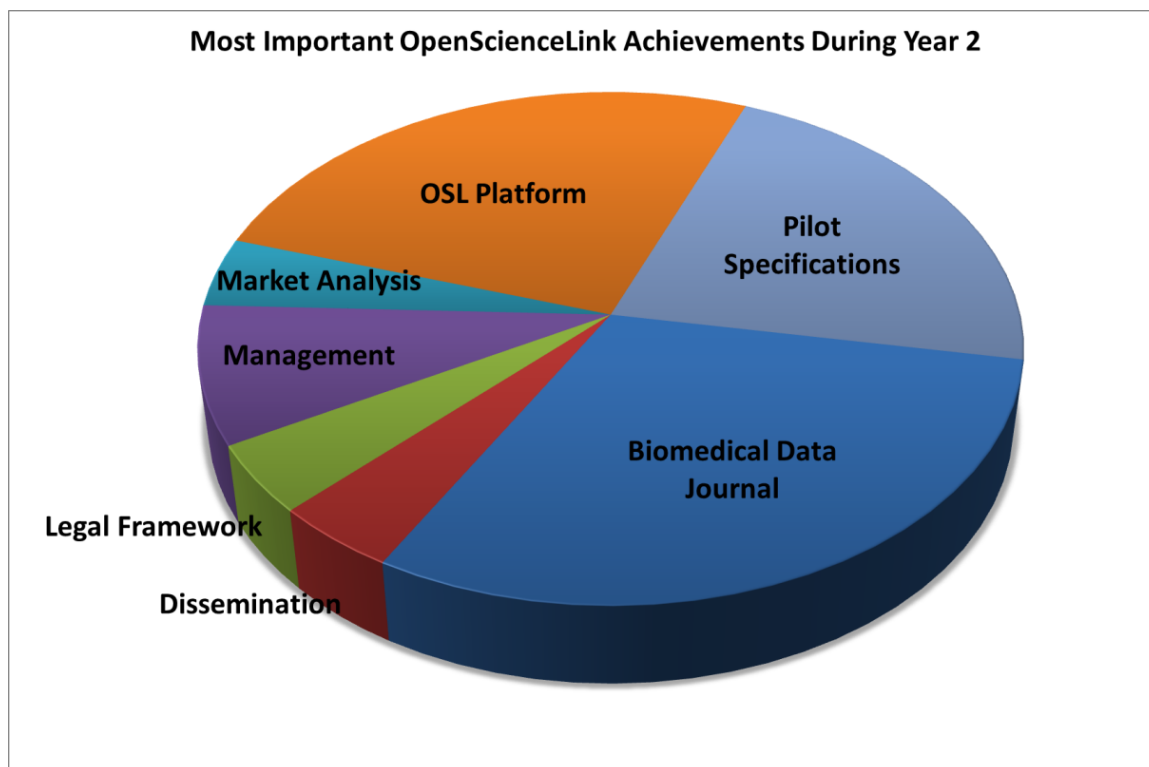


Figure 2: Summary of the most important OpenScienceLink project achievements according to questionnaire responses.

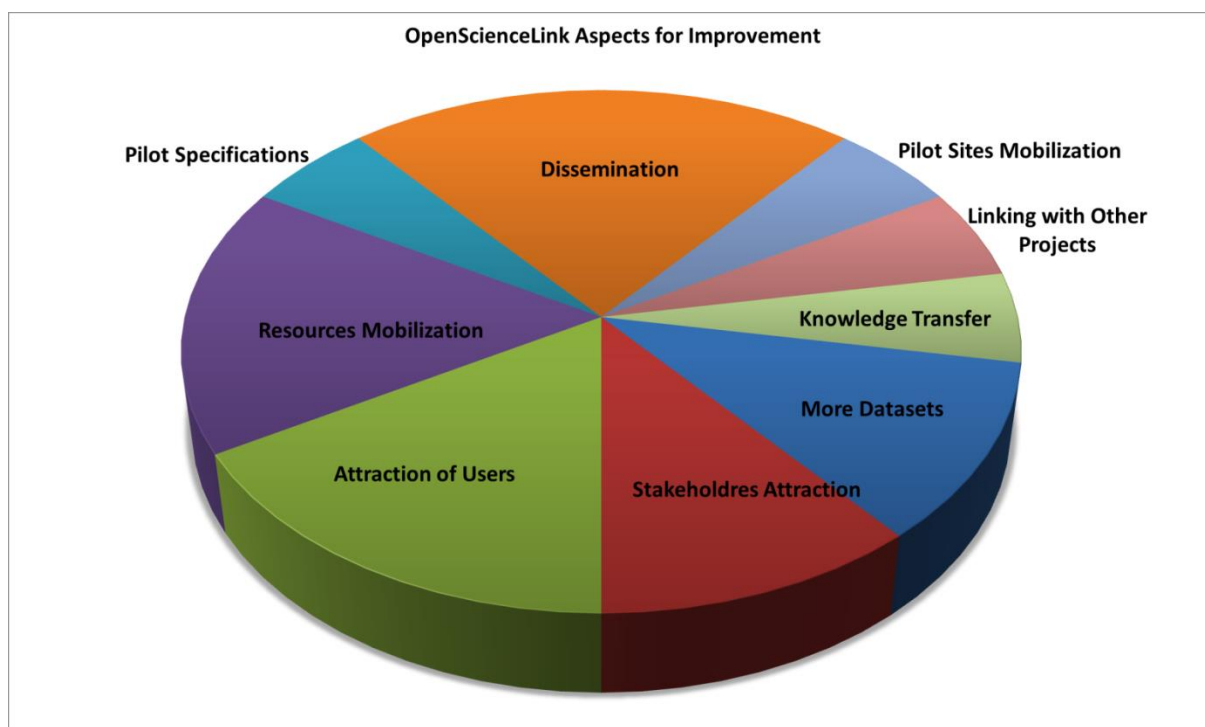


Figure 3: Summary of OpenScienceLink project aspects that can be improved according to questionnaire responses.

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 beta release of the OpenScienceLink platform (Year 2). 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.

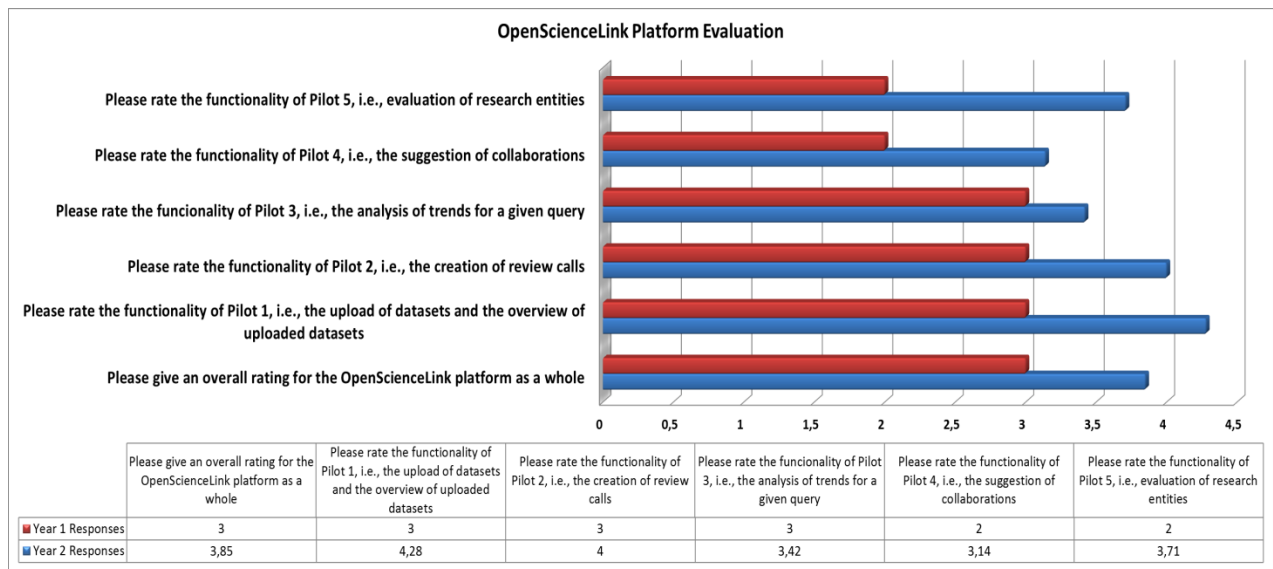


Figure 4: Evaluation of the OpenScienceLink platform as a whole.

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.

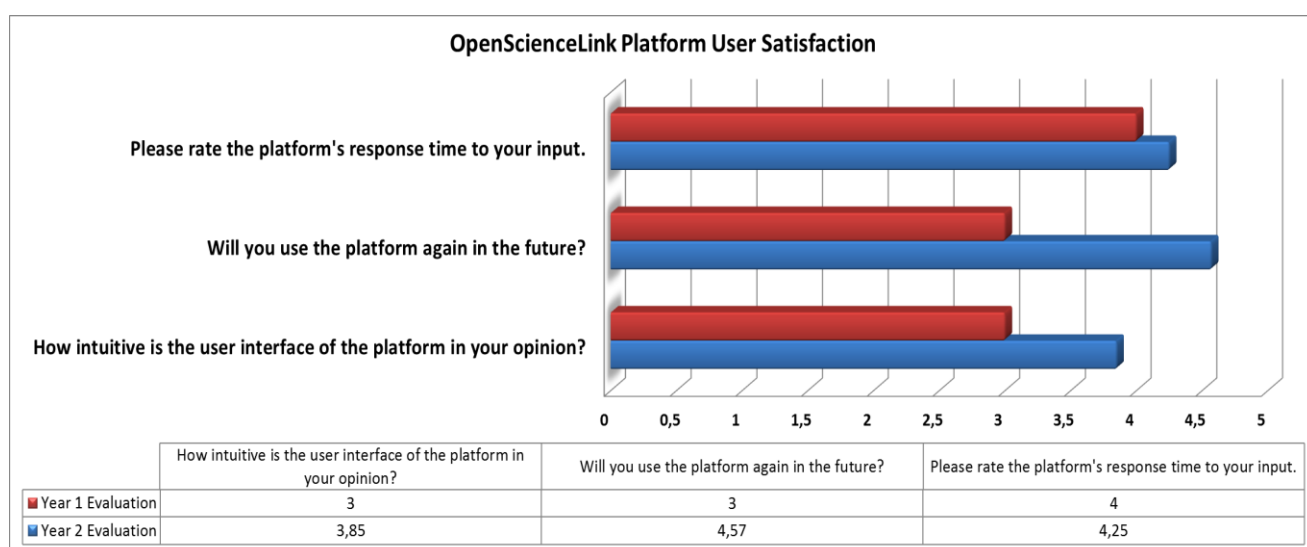


Figure 5: Summary of platform user's satisfaction.

2.2.3 Key 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 2nd year. 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 2, and the actual progress reported, are presented in the following four tables respectively.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
User participation	Number of user registrations in the OpenScienceLink platform	≥ 400	49
Active user participation	Number of users using the system at least once per month within a 3 month period	≥ 150	49
Stakeholder participation	Number of institutions (beyond the consortium) involved in the OpenScienceLink pilot operations	≥ 20	19
Funder participation	Number of research sponsors and/or funding authorities (beyond the consortium) involved in the OpenScienceLink pilot operations	≥ 2	2

International participation	Number of countries from which the OpenScienceLink Platform has been used at least once	≥ 10	16
Active international participation	Number of countries with active OpenScienceLink users (i.e., using the system at least once per month within a 3 month period)	≥ 9	16
Research domain involvement	Number of Biomedical and Clinical Research areas (such as cardiology, pharmacology, etc.) with researchers registered to the OpenScienceLink platform	≥ 8	26
Active research domain involvement	Number of biomedical and clinical research areas with active OpenScienceLink users	≥ 5	26
Open access	Number of indexed open access journal papers and datasets	≥ 2000000	2,760,000

Table 1: Mission Perspective KPIs for Overall Platform.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Funded projects beyond OpenScienceLink	Number of projects in which the OpenScienceLink services, models and tools are used and further developed.	9	8
Stakeholders with commercial interest	Number of stakeholders having formally expressed commercial interest	0	2
Journal publications	Number of OpenScienceLink-related scientific journal papers published by consortium members	≥ 4	21
Blog and website publications	Number of posts on blogs and websites about OpenScienceLink	≥ 3	7

Conference publications and presentations	Number of OpenScienceLink-related papers, presentations and presence at conferences, workshops and exhibitions	≥ 7	7
Joint workshops with other projects or related national initiatives	Number of workshops held with other projects or related initiatives	≥ 2	4
OpenScienceLink website visitors	Number of unique visitors to the OpenScienceLink website	≥ 200	34,146
Links to OpenScienceLink website	Number of external websites referring to OpenScienceLink website	≥ 15	6 (approx. 20 including the hidden web)
OpenScienceLink press releases	Number of OpenScienceLink-related press releases published by consortium members	≥ 5	3
Project dissemination outside Europe	Number of OpenScienceLink-related events to which consortium members participated outside Europe	-	1
Project marketing	Number of OpenScienceLink-related marketing materials (e.g., leaflets, banners, posters) produced and distributed by consortium members	≥ 400	540
Targeted contacts and approached potential customers	Number of stakeholders and potential customers (publishers, research organizations, universities) contacted by consortium members	≥ 15	10
Reached policy and decision makers	Number of policy and decision makers contacted by consortium members	≥ 3	5

Table 2: Resource Perspective KPIs for the Overall Platform.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Increase in data paper creation	Increase in number of data papers created per researcher	$\geq 15\%$	Approx. 80-100% (very small sample)
Creation of Best Practices (BPs) and Blueprints	Number of distinct Best Practices (BPs) and Blueprints Produced	≥ 2	1

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

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Involvement of young researchers in the project	Number of PhD students and Postdocs participating in the project	≥ 10	15
Career advancement of the OSL team	Number of received PhD degrees and relevant habilitations	1	2

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. In the registration page of the year 2 version of OSL platform two links have been added to “ [OpenScienceLink Terms and Conditions](#)” and “[OpenScienceLink Privacy Notice](#)” describing how the personal information entered by the user will be handled by the platform. The user after reading these terms has the choice to provide consent.
2. The “research topics” as it appears in the year 2 version of the platform needs to be expanded in order to support the purposes of the project. First, the provided options of “research topics” do not cover important scientific areas (e.g. endocrinology). Second, for the purpose of creating an efficient system for selection of reviewers, more specific information is needed. For example, the option “Cardiovascular diseases” is very general. Thus, it is important to collect the specific areas of expertise for each user. An approach could be to divide into macroareas (e.g. cardiology) and then into more specific areas (e.g. echocardiography).
3. The year 2 version of the OSL platform includes collection of basic personal information (such as name, surname, e-mail) and professional information (such as institution, type of institution, country and job). It should be examined how useful could be the collection of a more detailed personal profile of the user while taking into account 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
 - ORCID 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
 - An option to check box if they want to receive newsletters

2.3.1 Pilot 1: Open-access Data Journals Development

The evaluation annotates the following:

1. The beta version of the OSL platform includes a very friendly functionality for uploading submitted datasets. It permits the uploading of both the text file and the dataset file. This functionality incorporates important information for the creation of the metadata in order to achieve the goal of well-structured and semantically linked datasets. In this regard, it includes the definition of keywords based on main and minor topics and the crucial discretion between experimental or clinical data. Importantly, the submitting author is asked to list the PubMed IDs of the articles that the submitted dataset has been used in.
2. A consideration should be given 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
3. In the beta version of the OSL platform a search functionality has been added. This functionality is based on the insertion of specific keywords by the user and provides the ability to find related datasets. This is crucial for Data Journals Development since it will make easier to find related datasets and will greatly support use and reuse of datasets from the scientific community. Thus, it will promote credit for dataset publication and boost the impact to society.
4. A consideration should be given to the format that will be used to submit a dataset. It would be This format Define how will the user (editor, reviewer etc) be able to open the specified file of the dataset in different formats

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Usage of the data articles	Number of views per month	1000	1370
	Number of downloads per month	150	750
	Citations	10	8
Usage of related datasets	Number of downloads per month	20	0

Usage by the media	Number of articles in popular media, including specialized blogs	3	3
Contributions	Submitted articles per quarter	15	12
Pool of reviewers	Number of researchers that have expressed an interest/ consent	20	5
Interested funders	Number of Research Sponsors and/ or Funding Authorities registered at the OSL platform	2	1
Geographic coverage	Number of countries represented on Editorial Board, authors or reviewers	10	10
Domain coverage	Number of biomedical and clinical research areas addressed by published data articles	10	24
Coverage by aggregators	Inclusion in indexing (including ISI ¹) and aggregator services	3	3 (pending approval)
Library usage	Inclusion in library catalogues	20	3

Table 5: Mission Perspective KPIs for Pilot 1.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Revenues from subscription for the hard copy	Number of paid subscriptions	10	0
Sponsorship	Number of funding agencies either directly sponsoring the journal or agreeing to sponsor the publication of individual contributions	2	0
Advertising	Value of advertisements in the journal or on the publisher's website in Euro	200	0

Table 6: Resource Perspective KPIs for Pilot 1.

¹Thus providing for getting an impact factor in the future.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
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	tbd

Table 7: Internal Business Processes KPIs for Pilot 1.

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

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 new structure of the platform that discriminates between “author activities”, “reviewer activities” and “editor activities” greatly facilitates the review process
2. The current version of the platform has the ability to incorporate reviewing templates based on the evaluation of datasets and allows the user to complete these templates and submit a revision.
3. The beta version of the platform is able to automatically generate and send emails to selected reviewers and then notify the editor whether they accepted the invitation or not.

4. The platform has the ability to create a list of suggested reviewers based on the metadata and the abstract of each submission. This functionality is of great help to the editor who takes final decisions about the selection of reviewers. However, a crucial problem in this process is the high rate of decline of invited reviewers. It would greatly help to overcome this problem if the platform could provide some statistics about the performance of each reviewer such as number of pending reviews, rate of acceptance of review invitations, mean time to complete review etc.
5. The idea of an open reviewing process would be of added value to the platform and should be considered. 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. We could consider the possibility to open a discussion but this could be time-consuming and may lengthen the review process.
6. Reviewers could use the platform to get credit if they automatically receive information via email about number of reviews performed, speed of response in comparison with other reviewers, impact of accepted papers that they had reviewed etc.
7. Post-publication review –platform users could comment on published paper without formal letter to editor or similar type of publication. This could promote scientific discussion leading to collaborations and new ideas
8. Reviewer could have an option to write 50-100 word short comment on the paper that would appear after references of the original paper.
9. It would be useful if the platform could provide assistance to reviewers, for example, the platform could automatically generate statistics about author (no of pubs, h-index, OSL score) and main topic (novelty etc.)

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Review request load	Number of review requests sent	200	6
Reviewer acceptance	Number of accepted review requests	150	1
Submitted reviews load	Number of submitted reviews	130	0
Success of reviewer recommendations	Number of review invitations based on platform suggestions	190	6
Usage by external venues	Number of venues for which reviews were requested	1	1
Number of Authorships	Number of authors whose publications were put up for review (cumulative)	100	4

Table 9: Mission Perspective KPIs for Pilot 2.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Speed of the review process	Control group	>=15%	tbd

Table 10: Resource Perspective KPIs for Pilot 2.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Attraction of more competent reviewers	Questionnaire responses	>=50%	tbd
Increased number of reviewers per review	Control group	>=50%	tbd

Table 11: Internal Business Processes KPIs for Pilot 2.

KPI	Measure	Expected progress	Actual progress
		Year 1	Year 1
Profile growth	Number of new platform profiles created by invited reviewers	100	1

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

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

The evaluation annotates the following:

1. The beta version of the platform nicely provides research trends analysis based on number of publications and relative research interest. The calculation of relative research interest has been improved in comparison to previous version of the platform. It would be of added value if the platform automatically provide trends of different subfields within a certain field. For example, the editor of an endocrinology journal could check which subfields show the highest research interest within the field of endocrinology.

2. Important information about research interest could be collected from social media and blogs and not only from analysis of the number of publications. For example, a temporal analysis of the number of times that a field or subfield is mentioned in social media and blogs could be an interesting index.
3. A different type of research trends could be provided from data about ongoing clinical trials (e.g. from clinicaltrials.gov). A trends graph incorporating the number of ongoing clinical trials per year for a given disease or drug could be an trends index with high importance for the pharmaceutical industry, publishers and academia.
4. It is useful for the user to specify the source of the information obtained. For example PUBMED, SCOPUS SCHOLAR etc., when we look for research arguments and for publication on a researcher.
5. When in the trends functionality the user tries to define publications of a specific author per year some publications are not shown although they present in Pubmed.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Trend searches	Number of executed trend searches	6000	266

Table 13: Mission Perspective KPIs for Pilot 3.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Acceleration of trend identification	Questionnaire (percentage of users that identified trends faster)	40%	tbd

Table 14: Resource Perspective KPIs for Pilot 3.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Trend detection F-Measure	F-Measure of hot topics predicted correctly by the platform for the following year	$\geq 20\%$	40%

Table 15: Internal Business Processes KPIs for Pilot 3.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Expansion of Biomedical Data Journal through Trend Detection	Number of special issues for Biomedical Data Journal based on detected "hot topics"	1	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. The current version of the platform nicely provides the existing collaborations based on the existing publications. It is important that the platform is able to describe different levels of strength of collaborations. It is important that this functionality is expanded 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. Other factors that could be important in selection of potential collaborations is the esteem of the partner's institution and the productivity of the partner derived from number of publications during the last years.
3. It could be nice to distinguish the collaborations according to the arguments (selected on the basis of the key words). This can be made adopting a different color for a different argument.
4. The efficiency of collaborations functionality should be improved. All the collaborations are not shown. The way that the platform retrieves and analyzes this information needs to become more efficient.
5. Homonym authors are a problem and sometimes are causing confusion. Solution to this problem should be found.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
User Attraction	Number of Researchers /Scholars having used the pilot services at least once	≥ 500	47
User Engagement	Number of Researchers /Scholars having used the pilot services more than once	≥ 300	47

Table 17: Mission Perspective KPIs for Pilot 4.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Number of funded projects (<i>beyond OpenScienceLink</i>)	Number of projects in which the pilot models, services and tools are used and further developed	>=1	0
Number of Interested Stakeholders	Number of Stakeholders to whom the pilot has been presented and who have expressed interest	>=1	1
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	3

Table 18: Resource Perspective KPIs for Pilot 4.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
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	>=70%	tbd
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	>=65%	tbd

Table 19: Internal Business Processes KPIs for Pilot 4.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2

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	≥ 15	Approx. 25,000
--------------------------------------	--	-----------	----------------

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 current version of the OSL platform provides evaluation of the following **entities**: countries, cities, journals and authors. The query term that is evaluated can be of different kinds, e.g., a research area, a scientist or an institution.
2. A new **evaluation metric** has been implemented called OpenScore and is deployed only for authors in the current version. It is interesting that this metric takes into account a large set of openly accessible features (e.g., number of papers, journals, collaborators) to provide a final evaluation for each author. Evaluation for authors provided by this new metric seems accurate in most cases.
3. It would be nice for the user to know how the Open Score is calculated and how it can be interpreted.
4. It has to be taken into consideration that the evaluation refers to evaluation of different subjects. The subject of evaluation could be a researcher, a department, an institution, a journal or a specific publication. Different metrics could apply according to the subject of evaluation. Thus, it may be important to distinguish the processes of evaluation according to what is evaluated.
5. In this service, the number of publications besides an author name is automatically calculated. In some cases the presented number of publications is significantly smaller than it appears in Pubmed . May be the source of this information should be redefined.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Stakeholders' Interest	Number of stakeholders (e.g., publishers) indicating interest in the developed evaluation metrics	≥ 2	2
Metrics Use	Number of entities which have introduced at least one of the evaluation metrics to their evaluation process	≥ 1	0

Table 21: Mission Perspective KPIs for Pilot 5.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
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	3
Pilot Visibility: Web Presence	Number of posts at blogs and web sites about the pilot	≥ 3	3

Table 22: Resource Perspective KPIs for Pilot 5.

KPI	Measure	Expected progress	Actual progress
		Year 2	Year 2
Acceptability of research evaluation metrics	Percentage of experts indicating that the developed metrics are of value for the research community	$\geq 70\%$	60%
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	$\geq 10\%$	20%
Improvement of research evaluation metrics: comparison	Percentage of past research papers for which existing evaluation metrics required at least 1 year more than the proposed metrics to indicate their importance in the field	$\geq 5\%$	tbd

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. <i>It is infeasible to perform other tests if the Basic Tests fail.</i>
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	Behavior 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 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 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 <table border="1" data-bbox="470 1142 1284 2072"> <thead> <tr> <th>Tests Class</th> <th>Tests Subclass</th> <th>Behaviour</th> </tr> <tr> <th>Name</th> <th>ID</th> <th>Type</th> </tr> </thead> <tbody> <tr> <td>Basic Tests</td> <td>BT</td> <td></td> </tr> <tr> <td></td> <td>OpenScienceLink Platform Setup</td> <td>OPS V</td> </tr> <tr> <td></td> <td>Connections check</td> <td>CC V</td> </tr> <tr> <td>Capability Tests</td> <td>CT</td> <td></td> </tr> <tr> <td></td> <td>Secure End user Connection</td> <td>SEC V</td> </tr> <tr> <td>Behavior Resolution Tests</td> <td>BER</td> <td></td> </tr> <tr> <td></td> <td>CF:Login</td> <td>CF-L V-I</td> </tr> <tr> <td></td> <td>CF:Registration</td> <td>CF-R V-I</td> </tr> <tr> <td></td> <td>CF:Searching</td> <td>CF-S V-I</td> </tr> <tr> <td></td> <td>Pilot 1: Upload Data Set</td> <td>P1-UDS V-I</td> </tr> </tbody> </table>	Tests Class	Tests Subclass	Behaviour	Name	ID	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
Tests Class	Tests Subclass	Behaviour																																			
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	Pilot 1: Create New Journal Issue	P1-NJI	V-I
	Pilot 2: Create Review Call	P2-CRC	V-I
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	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 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	Verify the ability of browsers to establish a connection with all

Description	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 tested.
Expected Result	All connections shown as established.
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	Behavior 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 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 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 Title	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 Title	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 Title	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 Title	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 Title	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 Title	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 Title	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)

3.4.3 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 ID	Case	OpenScienceLink_BER_P2-MRP_V_01
Test Title	Case	Managing the Review Process: Request Accepted
Test Description	Case	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 ID	Case	OpenScienceLink_BER_P2-MRP_V_02
Test Title	Case	Managing the Review Process: Request Denied
Test Description	Case	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 ID	Case	OpenScienceLink_BER_P2-RS_I_02
Test Title	Case	Review Submission Failed – Required Input Missing
Test Description	Case	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	Case	OpenScienceLink_BER_P2-MPR_V_01 has been completed successfully.
Testing Procedure	Case	The user attempts to submit the review without filling out all required fields.
Expected Result	Case	Presentation of an error message to the user indicating that required data has not been provided.
Test Result	Case	(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 ID	Case	OpenScienceLink_BER_P3-RTA_V_01
Test Title	Case	Request for Visualizing the Trend of a Given Topic Successfully
Test Description	Case	Verify the correct operation of the request for topic trend analysis visualization
Test Case Purpose	Case	To verify that the trend of existing topics are presented to the user through plots
Setup	Case	The user needs to have logged in the platform.
Testing Procedure	Case	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	Case	Presentation of the trend analysis plot for the research topic which the user has described through the query terms.
Test Result	Case	(Success / Failure)

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

Test ID	Case	OpenScienceLink_BER_P3-RTA_I_02
Test Title	Case	Request for Visualizing the Trend of a Given Topic - Missing or Incomplete Data
Test Case	Case	Verify the correct response of the service when no terms, or not supported

Description	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	Presentation of an error message to the user indicating that no data has been

Result	provided.
Test Result	(Success / Failure)

3.4.5.1.3 Request for Coauthorship Graphs Failed – Inappropriate data

Test ID	Case	OpenScienceLink_BER_P4-RFC_I_03
Test Title	Case	Request for Coauthorship Graphs Failed – Inappropriate data
Test Description	Case	Verify the correct response of the service when inappropriate data have been provided.
Test Purpose	Case	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 coauthorship graphs after filling 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 ID	Case	OpenScienceLink_BER_P5-RPT_V_01
Test Title	Case	Request for Publication Volume based on Topic Successfully
Test Description	Case	Verify the correct operation of the request for publication volume based on Topic
Test Purpose	Case	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 ID	Case	OpenScienceLink_BER_P5-RPT_I_02
Test	Case	Request for Publication Volume based on Topic Failed – Missing data

Title	
Test Case Description	Verify the correct response of the service when no terms describing a topic have been provided.
Test Case Purpose	To verify the correct response of the service when no 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 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 Description	Verify the correct operation of the request for evaluation score for an 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 any positive integer 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_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_P3-RTA_V_01	Success
OpenScienceLink_BER_P3-RTA_I_02	Success
OpenScienceLink_BER_P4-RFC_V_01	Success
OpenScienceLink_BER_P4-RFC_I_02	Success
OpenScienceLink_BER_P4-RFC_I_03	Success
OpenScienceLink_BER_P5-RPT_V_01	Success
OpenScienceLink_BER_P5-RPT_I_02	Success
OpenScienceLink_BER_P5-RPT_I_03	Success
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 University comprises 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.

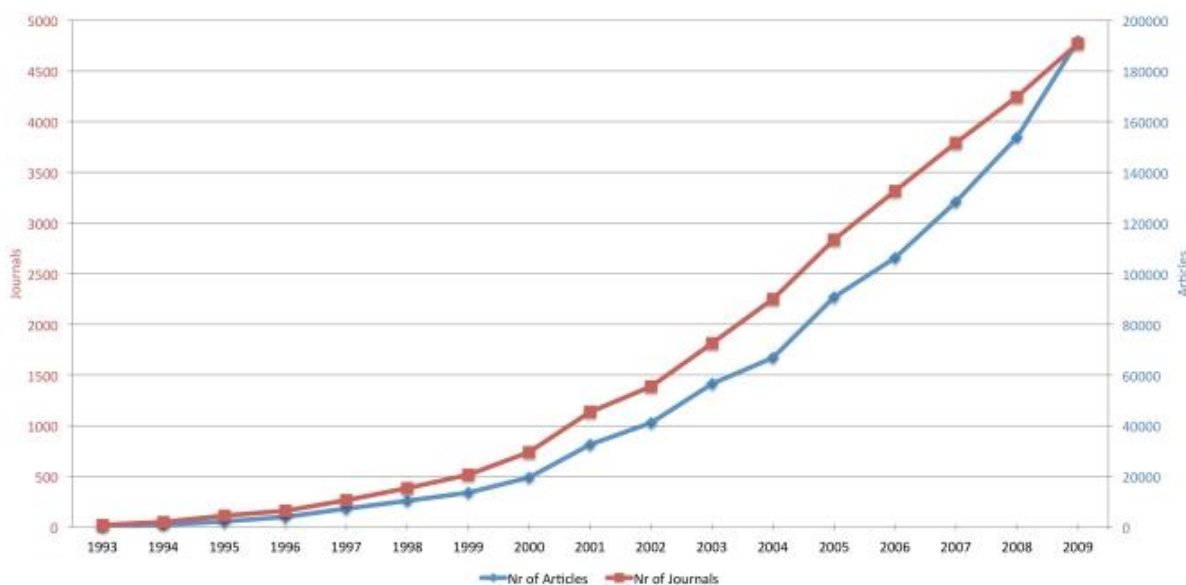


Figure 6: Open access publishing between 1993 and 2009.

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).

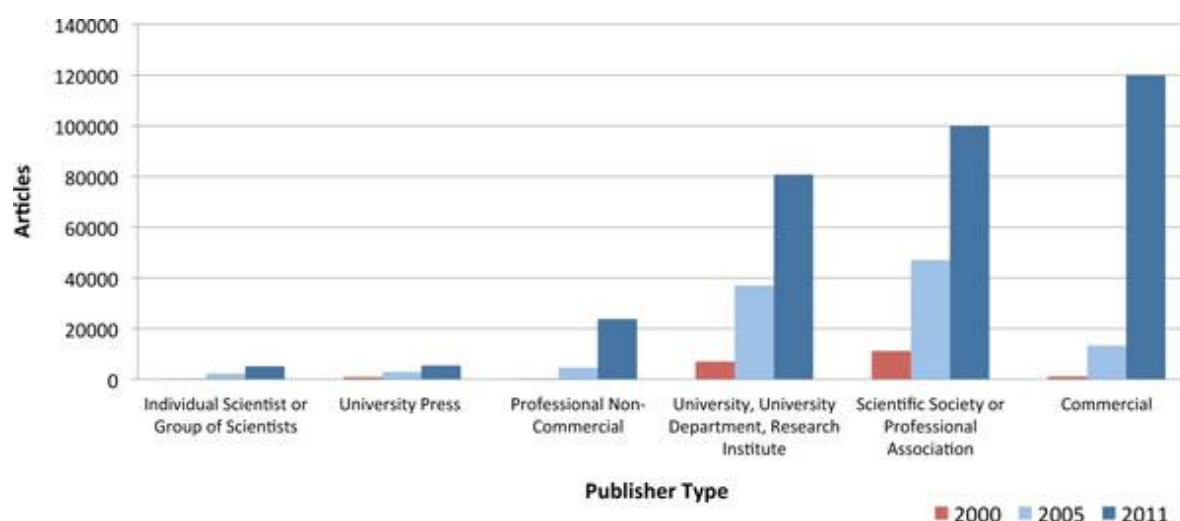


Figure 7: Different Publisher Types for Open Access Articles.

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.

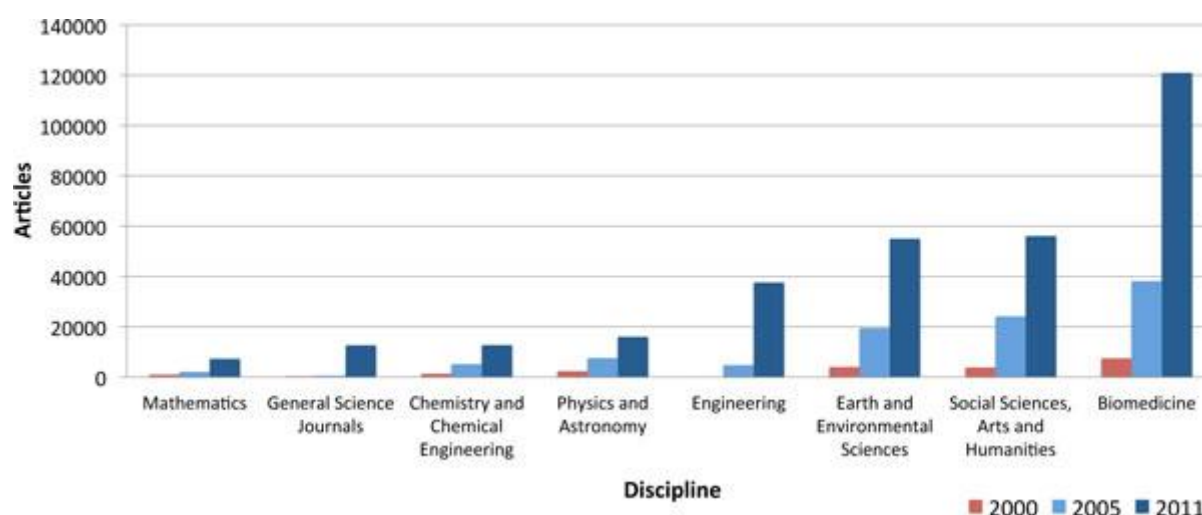


Figure 8: Open Access Articles across different disciplines.

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

Organization	Country	OA policy	OA Funding
<u>British Heart Foundation (BHF)</u>	UK	Yes	Yes
<u>Cancer Research UK</u>	UK	Yes	Yes
<u>Research Council UK (RCUK)</u>	UK	Yes	Yes
<u>Wellcome Trust</u>	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
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
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 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/	Potential Content source Planning to sign a MoU
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	Potential Content

Competitor	Brief Description	Relation to OpenScienceLink
	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	source
Biodiversity Data Journal	The first issue of the <i>Biodiversity Data Journal</i> , 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 <i>Geoscience Data Journal</i> , 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 <i>Journal of Open Archaeology Data</i> 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 <i>Journal of Open Psychology Data</i> 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	
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 organisation. It is indexed in the Directory of Open Access Journals (DOAJ), PubMed and PubMed Central.	Potential Content source, Publisher and Editor potentially 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
<i>Biodiversity Data Journal</i> , 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
<i>Geoscience Data Journal</i> , Wiley	n/a	\$1,500	
<i>GigaScience</i> (~BioMed Central)	0	0	Thanks to the support by BGI
<i>Journal of Open Public Health Data</i> , Ubiquity Press	0	0	"covered by funding"
<i>Genomics Data</i> , Elsevier	\$ 100	\$ 500	Additional charges if formatting and copy editing is necessary
<i>Scientific Data</i> , Nature Publishing Group	-30%	\$ 630/700	Depending on the type of Creative Commons License
<i>Journal of Defense Management</i> , 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.

Increase revenue predictability and direct support

- 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	<p>EasyChair facilitates conference organisers in the refereeing process through:</p> <ul style="list-style-type: none"> - management and monitoring of the program committee; - management of the access of PC members and referees to papers and conflicts of interests; - automatic paper submission; - paper assignment based on the indicated preferences of PC members; - submission of reviews; - notification of PC members, referees and authors via e-mail; - online discussion of papers; - the author response (aka rebuttal) phase, when the author can respond to the reviews; - automatic preparation of conference proceedings <p>http://www.easychair.org/</p>	<p>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</p>
FluidReview	<p>FluidReview is an application management and review system, which allows hosting peer reviews online for scholarships, grants, proposals, fellowships, journal articles, etc. It facilitates the appointment of reviewers for specific submissions or the entire collection and provides customized ranking and evaluation forms & tasks. Reviewers can perform their tasks collaboratively through comments and annotations. It mainly focuses on application and submission management, with the review process being facilitated mainly through customisable forms, storing of submission material and statistics (such as number of reviews under processing, etc.). No tools for comparing applications and no linking with or search through literature is provided.</p> <p>http://fluidreview.com</p>	<p>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.</p>
Public Knowledge Project - Open Journal Systems	<p>OJS is open source software made freely available to journals worldwide for the purpose of making open access publishing a viable option for more journals. OJS assists with every stage of the refereed publishing process: It follows articles from submission, through peer review, copyediting, layout editing, proofreading, and on to publication.</p>	<p>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.</p>
ArnetMiner	<p>ArnetMiner recommends reviewers based on title, authors, abstract, and venue (conference/journal). The recommendations are presumably based on the "academic social network" that is the core of ArnetMiner.</p> <p>http://arnetminer.org/reviewer-home</p>	<p>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</p>

Competitor	Brief Description	Business models
		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.

Table 35: Pilot 2 Competitors and business models

Service Provider	OpenScience Link	EasyChair	FluidReview	ArnetMiner	Knowledge Project - Open Journal Systems
Service					
OpenScienceLink Pilot 2 functionalities					
Paper-based reviewers suggestion	+	-	-	+	-
Review support	+	-	-	+	-
Review form submission	+	+	+	+	+
Open-identity post-review discussion	+	-	+	-	-
Focusing on the life sciences	+	-	-	-	-
Costs	-	-	+	-	-
Help/tutorials/documentation					

Service Provider / Service	OpenScience Link	EasyChair	FluidReview	ArnetMiner	Knowledge Project - Open Journal Systems
Online help	+	http://www.easychair.org/faq.cgi	-	http://arnetminer.org/reviewer-home	http://pkp.sfu.ca/wiki/index.php?title=OJS_Documentation
Video tutorials	+	+	http://fluidreview.com/videos	-	-
Contextual help	+	-	-	-	-

Table 36: Pilot 2 positioning of competitive products

4.3.2 Targeted customers and stakeholders.

Customer/Stakeholder	Marketing Approach
Researchers	Gain recognition and career rewards for reviewing; Gain experience as reviewers .
Publisher	Speed up and ensure high quality of the review process. Improve their own submission platforms by using the offered services that support a semi-automated review process. Introduce new models in reviewing process
Editor	Gain time in findings more reliably competent reviewers for their journals. Increase acceptance rate of invited reviewers. Increase quality of reviewing process
Research Sponsors and Funding Authorities	Seek guarantees that published results (e.g. datasets) of sponsored research have been subject of rigorous review of high quality.

Table 37: Pilot 2 targeted customers and stakeholders

Customer/Stakeholder	Brief Description	Why to use the Platform
SpringerOpen	Publisher	Expressed interest in reviewer suggestion and suggested including "reviewer score".
Elsevier	Publisher	Electronic Manuscript Submission System (EMSS) currently doesn't offer automatic assistance for carrying out the review process or automatic selection of qualified reviewers.
Nature Group	Publisher	Reviewer suggestion functionality potentially relevant for "Scientific Data" data journal.

Table 38: Examples of Pilot 2 targeted customers and stakeholders

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
<p>TechCast</p>	<p>TechCast offers online technology forecasts and technology articles on emerging technologies which are based on scanning of the literature and media, interview authorities, and other sources by their researchers in order to identify trends and background data on roughly 70 emerging technologies. Their website pools background data and the knowledge of 130 experts worldwide to forecast breakthroughs in all fields and to assess their economic and social impact. TechCast researchers and editors scan the literature and media, interview authorities, and draw on various other sources to identify trends and background data on roughly 70 emerging technologies. This data is summarized to guide the estimates of 130 technology officers, research scientists and engineers, scholars, and other experts to estimate of the most likely year each breakthrough will occur, the potential economic demand, and experts' confidence. TechCast also offers comprehensive technology consulting services as well as customized technology forecasting and studies.</p> <p>http://www.techcast.org/</p>	<p>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</p> <ol style="list-style-type: none"> 1. Professional Subscription for General Managers, Technology Officers, CIOs, Strategic Planners, Technology Transfer, Business Development, and others in business and governments who 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
<p>The Millennium Project</p>	<p>The Millennium Project is an independent non-profit global participatory futures research think tank of futurists, scholars, business planners, and policy makers who work for international organisations, governments, corporations, NGOs, and universities. The work is distilled in its annual "State of the Future", "Futures Research Methodology" series, special studies, and integrated into this Global Futures Intelligence System. Its primary products include:</p> <ul style="list-style-type: none"> - On-going assessment of the most significant long-range issues and opportunities, and focused analysis of policies and agencies to address them; - Communications network of futurists and scholars with an international futures research information system with public access; - Advanced training in the methodology and analysis of critical issues, opportunities, and challenges of the future. <p>Moreover, it produces:</p> <ul style="list-style-type: none"> - The annual State of the Future report which is based on integration of the Project's work as well as others' forecasts, and previous years' reports; - Special studies such as Future Issues of Science and Technology, Futures Research Methodology, Middle-East Peace Scenarios and Future of Africa; 	<p>The Project is sustainable with the important financial support of all kinds of sponsors such as</p> <ul style="list-style-type: none"> • 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

Competitor	Brief Description	Business model
	<p>It includes discussion rooms and mailing lists and manages a coherent and cumulative process that collects and assesses judgments from over 3,500 people. http://www.millennium-project.org/index.html</p>	<ul style="list-style-type: none"> • 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	<p>Arnetminer is designed to search and perform data mining operations against academic publications on the Internet, using social network analysis to identify connections between researchers, conferences, and publications. This allows it to provide services such as expert finding, geographic search, reviewer recommendation, association search, course search, academic performance evaluation, and topic modeling. ArnetMiner provides hot topics based on data processed from the Web. Its trend identification is based on their Author-Conference-Topic (ACT) model, through which they automatically discover hot topics from the publications. It also provides a search for the trend analysis of a specific topic. Arnetminer is commonly used in academia to identify relationships between and draw statistical correlations about research and researchers. http://arnetminer.org/</p>	<p>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.</p>
TrendMiner Project	<p>The goal of the Trendminer project is to deliver innovative, portable open-source real-time methods for cross-lingual mining and summarisation of large-scale stream media (e.g. weblogs, Twitter, Facebook). TrendMiner will achieve this through an inter-disciplinary approach, combining deep linguistic methods from text processing, knowledge-based reasoning from web science, machine learning, economics, and political science. Results are validated in high-profile case studies: financial decision support (with analysts, traders, regulators, and economists), political analysis and monitoring (with politicians, economists, and political journalists), detection of psychosocial states and social information, and detection of discussions on medicine and drug effects in social media. http://www.trendminer-project.eu/index.php/obj</p>	<p>TrendMiner is an EU-funded project</p>
Google Trends	<p>Google Trends analyzes a percentage of Google web searches to determine how many searches have been done for the terms you've entered compared to the total</p>	<p>Google Trends follows the the commercial open source business model. Some of the functionalities are available for free, potential</p>

Competitor	Brief Description	Business model
	<p>number of Google searches done during that time.</p> <p>Google Trends performs a breakout analysis to show "rising searches". Rising searches are searches that have grown significantly in popularity over a given time period when compared to a preceding time period. The provided analysis covers only the period after January 2004.</p> <p>http://www.google.com/trends/</p>	<p>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.</p>
Institute For The Future	<p>IFTF is an independent, non-profit research institute that maintains research programs on the futures of technology, health, and organizations. It publishes a variety of reports and maps, as well as a blog on emerging technologies. The research staff of IFTF includes experienced forecasters representing a range of disciplines from the social sciences, public policy, and technical domains. IFTF also works through a network of affiliates who bring a diversity of perspectives and experiences from university professors to independent thought leaders and hands-on innovators</p> <p>http://www.iftf.org/</p>	<p>IFTF is an independent, non-profit research institute IFTF is sustainable with the important financial support of academic institutions and private sponsors.</p>
Essential Science Indicators	<p>ESI is a research-analytics platform within the Web of Science that provides a comprehensive compilation of science performance statistics and science trends data based on journal article publication counts and citation data from Thomson Reuters databases. It is an analytical resource for policymakers, administrators, analysts and information specialists in government agencies, universities, corporations, private laboratories, publishing companies, and foundations, as well as members of the scientific press and recruiters. ESI can identify significant trends in the sciences and social sciences.</p> <p>http://wokinfo.com/products_tools/analytical/essentialscieceindicators/</p>	<p>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.</p>

Table 39: 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 therefor 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 market will have reached a state where especially Europe should be stable positioned before global M&A deals start. Our “product” will by then be in fully developed state and beyond state of the art.

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

Customer/Stakeholder	Marketing Approach
Researcher	Avoid starting or reconsider continuing working on research topics which are in decline. Discover the “hot” research areas to upgrade your research.
Universities/Academic Institutes/Scientific Societies	Facilitate effective distribution of academic resources to the research efforts. Assist in the organization of scientific congresses and meetings to include “hot” topics and invite top researchers.
Editor	Facilitate the reviewing of proposals about the organisation of special issues Support the decision process concerning the organization of special issues in fields with rapidly rising interest. Detect top authors in a field that could be invited to contribute to a special issue or a new journal.
Publishers	Tool for re-evaluating the topics that their journals focus on as well as for deciding upon the issuing of a new journal (aiming at a rising and promising topic). Detect top researchers in a topic or field and invite them to become editors or members of the editorial board.
Enterprises with R&D departments (e.g., pharma)	Access to a series of tools and services which can significantly assist building their research strategy and allow for more effective positioning of their resources in research efforts.
Research Sponsors and Funding Authorities	Use of the platform for consultation when preparing research agendas and calls for research proposals. Assist in decision about proposals for research grants.
Media	Improvement of the media coverage of scientific areas, fields and topics which are considered as uprising or reviving and their progress could potentially be of interest to the public. Fast and effortless identification of top or rising scientists in specific topics, fields or areas for whom documentaries could be prepared or interviews be taken.

Table 40: Pilot 3 targeted customers and stakeholders

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 comprises a social networking site for	ResearchGate is a for-profit

Competitor	Brief Description	Business model
	<p>scientists to share papers, ask and answer questions, and find collaborators. It has been described as a mash-up of “Facebook, Twitter and LinkedIn” that includes “profile pages, comments, groups, job listings, and ‘like’ and ‘follow’ buttons”. Members are encouraged to share raw data and results from both failed and successful experiments. Based on the scientist’s profile, it regularly suggests papers of their interest for reading, which then the person may request from the author through the platform. Job announcements are also provided. It offers a series of statistics which can be shared in Facebook, LinkedIn, Twitter and g+.</p> <p>https://www.researchgate.net</p>	<p>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.</p>
ArnetMiner	<p>ArnetMiner provides search and mining services for researcher social networks. In particular, it creates a semantic-based profile for each researcher by extracting information from the Web and integrates academic data (e.g., the bibliographic data and the researcher profiles) from multiple sources. Moreover, it analyzes and discovers patterns from the built researcher social network. The main search and analysis functions in ArnetMiner include: Profile search, Expert finding, Course search, Sub-graph search.</p> <p>http://arnetminer.org/</p>	<p>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.</p>

Competitor	Brief Description	Business model
MyScienceWork	<p>MyScienceWork is a communication platform including more than 31 million open access publications from over 30 disciplines. It includes an international community of researchers, engineers, students and science communicators. Users are allowed to comment upon and annotate publications. Moreover, job announcements are available.</p> <p>http://www.mysciencework.com/#the-research-network</p>	<p>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</p>
Academia.edu	<p>Academia.edu is a platform where academics can build a personal profile page, follow other researchers in their field, upload documents and discover recently published research. The platform's interface is <u>deliberately designed</u> for better self-promotion and building the personal brand of the individual academic. The profile page is highly customisable and prominently offers a dashboard with access statistics..</p> <p>https://www.academia.edu</p>	<p>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 Price <u>expressed</u> 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%.'</p>
Methodspace	<p>Methodspace is an online network of researchers for sharing research, resources and debates. Methodspace users have free access to selected journal articles, book chapters, etc. which highlight emerging topics in the field.</p> <p>http://www.methodspace.com/</p>	<p>Methodspace is a non-profit free online network of researchers, resources and debates.</p>
<u>Mendeley</u>	<p><u>Mendeley</u> is both a desktop reference management app and an online community which offers its users one gigabyte free cloud storage for publications and added forums for sharing and discussing research. So far its 2 million members have shared over 336.000 documents, and are organised in over 203.000 more or less active research groups.</p> <p>http://www.mendeley.com/</p>	<p>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.</p>

Competitor	Brief Description	Business model
Microsoft Academic Search	It is an experimental research service designed to explore how scholars, scientists, students, and practitioners find academic content, researchers, institutions, and activities. As is true of many research projects at Microsoft, this service is not intended to be a production Web site, and it will likely be taken offline when appropriate given the research goals of the project. 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.

Table 40: 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 today's 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.

Customer/Stakeholder	Marketing Approach
Researcher	<p>Broaden up collaborations with other researchers and/or research groups and communities.</p> <p>Increase potential for research synergies and visibility for job positions.</p> <p>Find collaborators, who are highly relevant to the topic of their interest, fast and effortlessly.</p> <p>Be presented with the opportunity to join dynamically formed research communities and, thus, remain involved in activities within their field of interest.</p> <p>Be easily pulled out from the research "crowd".</p>
Publisher	Fast and effortless discovery of potential editors for their journals whose research activity fits well the journals' topics.
Editor	Increased and/or more targeted invitations to researchers for submission of articles journals and/or journal issues.
Research Sponsors and Funding Authorities	Efficient and effective discovery of potential evaluators for research work which has been applied for funding.

Table 41: Pilot 4 targeted customers and stakeholders.

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® provides researchers, administrators, faculty, and students with access to citation databases. Its content come from over 12,000 of journals worldwide, including Open Access journals and over 150,000 conference proceedings across more than 250 disciplines. 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	<i>InCites™</i> is a customized, web-based research evaluation tool that allows researchers to analyze institutional productivity and benchmark their output against peers worldwide. With customized citation data, global metrics, and multidimensional profiles on the leading research institutions as well as with robust visualization and reporting tools, it allows for the creating and sharing of reports. Its main features include: <ul style="list-style-type: none"> • Comparison of quantitative and qualitative aspects of performance against other institutions and world and field benchmarks • Presentation of influential and emerging researchers and research trends • Identification of potential areas for growth • Monitoring of collaboration activity and tracking of new collaboration opportunities 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 sign in to have access to a web-based platform.
ResearchGate	It calculates a ResearchGate (RG) score based on the publications' views and downloads, who interacts with them and how often, the number of questions posed and answered and the number of followers. It also provides the scientist's positioning among its members in terms of the score in the form of a percentage. The RG score includes a subset of the parameters that the OpenScienceLink will use for evaluating scientists.	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 presents researchers with evaluation for academics based on 8 measures; "H-index", "Citation", "Uptrend,	Arnetminer follows the the commercial open source business model. In this model, the product is

Competitor	Brief Description	Business model
	<p>"Activity", "Longevity", "Diversity", "Sociability", "New Star". Scientists in a field are ranked based on them. It only provides scientists' evaluation. Although not a domain-focused platform, it mainly focuses on ICT. http://arnetminer.org/</p>	<p>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.</p>
<p>Google Scholar Metrics</p>	<p>Google Scholar Metrics is a tool for authors to evaluate the visibility and influence of recent articles in scholarly journals; it also helps authors as they consider where to publish their new research. Google Scholar Metrics provide with possibilities to (a) browse the top 100 publications in several languages ordered by their five-year h-index and h-median metrics; (b) explore publications in research areas of your interest; (c) Scholar Metrics currently cover articles published between 2008 and 2012, both inclusive. http://scholar.google.lt</p>	<p>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.</p>
<p>Harzing's Publish or Perish</p>	<p>Harzing's Publish or Perish is a freely available software program that presents with evaluation of author's impact and journal's impact based on a number of citation indexes (e.g., number of papers and citations, cites/year, h-index, g-index) according to Google Scholar and Microsoft Academic Search. http://www.harzing.com/pop.htm</p>	<p>Its sustainability depends on fund raising from academia and research institutions</p>
<p>Microsoft Academic Search</p>	<p>Microsoft Academic Search indexes millions of academic publications. As is true of many research projects at Microsoft, this service is not intended to be a production Web site, and it will likely be taken offline when appropriate given the research goals of the project. In Microsoft Academic Search, objects in the search results are sorted based on two factors: (a) their relevance to the query; (b) a static rank value that is calculated for each item in the Microsoft Academic Search index. The static rank encompasses the authority of the result, which is determined by several details, such as how often and where a publication is</p>	<p>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.</p>

Competitor	Brief Description	Business model
	cited.	
Scopus	<p>Scopus features smart tools to track, analyze and visualize research. Scopus delivers an overview of the world's research output in the fields of science, technology, medicine, social sciences and arts and humanities. Scopus provide users with possibilities to: (a) Track citations over time for a set of authors or documents, with Citation Overview/Tracker; (b) View h-index for specific authors; (c) Assess trends in search results with Analyze Results; (d) Analyze an author's publishing output with Author Evaluator; (e) Gain insight into journal performance with Journal Analyzer and alternative journal impact metrics SNIP and SJR.</p> <p>http://www.elsevier.com/online-tools/scopus</p>	<p>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.</p>

Table 42: Pilot 5 competitors and business models.

Customer/Stakeholder	Marketing Approach
Researcher	<p>Access to research evaluation of high customisability and granularity; from researcher and research group to institutions and countries and from papers and data sets to journals and publishers for :</p> <ul style="list-style-type: none"> - efficient management of their own scientific curriculum vitae - having an instant view of the evaluation of: - researchers within their field in order to direct their collaboration interest or follow their work - scientific works in their field so that they remain always updated with important research results and efforts - available publishing means in their field and/or specific topic so that they make informed decisions about the journals and conferences through which they will publish their work - available entities (both academic and business ones) in their field – or related ones – so that they can investigate their job-related options with as much information available as possible.
Publisher	<p>Are given the possibility to have access at any time to the evaluation of their publishing means (including journals, journal issues, special issues, etc) from a variety of angles and be able to detect and highlight the one(s) in which they are best at (e.g., academic impact, business penetration, etc) for their dissemination and communication purposes.</p> <p>Instant access to the evaluation of researchers for making informed decisions when choosing editors and building the editorial board or when planning to invite researchers to submit papers to their journals.</p>
Research Sponsor and/or Funding Authority	<p>Access to the evaluation of researchers who apply for funding allowing for a more informed and less time-consuming decision process.</p>
Academic and/or Research Institution	<p>Continuous monitoring of the evaluation of their institution, schools, departments, groups, researchers from various aspects rather than relying on yearly analysis of their positioning among other institutions which is quite often based on partial data and very</p>

	specific evaluation metrics.
Media	<p>Improvement of the media coverage of biomedical articles which publish high quality research and of scientists whose research is of great value to their field rather than relying on the media's assessment of the scientific research value (with its main driver quite often being potential appeal to readers).</p> <p>Increased credibility and improved reputation of the media means (newspaper, magazine, electronic news portal, etc) by avoiding publishing of scientific articles which are of low scientific validity and may lead to confusion, cause false hope or unsubstantiated worries to the public.</p>

Table 43: Pilot 5 targeted customers and stakeholders.

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 2 evaluation of the OpenScienceLink project from the perspective of interested stakeholders, technical achievements and business plans.

Based on stakeholders views, among the most important achievements in this first project period has been the development of the pilot specifications, the launching of the Biomedical Data Journal, and the release of the OpenScienceLink platform to the public. With regards to the most positive aspects of the platform in its current form, the three major points were: the dataset search engine, the automated suggestion of reviewers and the Openscore. 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. Based on previously defined Key Performance Indicators(KPIs)we performed a comparison of the expected with the actual progress that has been achieved during the 2nd year. From a total of 83 KPIs, the actual progress reported here has exceeded the anticipated progress in 14 KPIs, while it has stayed behind in 20 cases.

Concerning the technical evaluation, most of the contacted tests were successful, and this mature version of the platform was shown to work in a technically 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. An analysis of potential strategic partners and business plans has been performed in regards to the sustainability of the OSL platform after the project's end.

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