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Report on the Operations of the OpenSienceLink Pilot Services and Services/Processes Improvements

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Executive Summary

This deliverable reflects the outcomes of tasks T7.1, T7.2, T7.3 and T7.4 in terms of the pilot operation of the OpenScienceLink services. The report presents the validation of the five main pilot scenarios of the project. In addition, it reflects the outcome of task T7.5 by illustrating the suggested improvements in the various added-value services. Real life examples are used to illustrate the process of the pilots, and the results of each validation, as well as the challenges than are addressed are pointed out. The overall presentation of these results is based on five use cases that stem from the requirements specification documents of the OpenScienceLink project.

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1 Introduction

This deliverable focuses on the operation of the OpenScienceLink pilot services. In particular, the main activities are conducted:

- We **report** on the operations of all five pilots;
- We **validate** the current state of affairs of every pilot;
- We **suggest improvements** to the pilot activities, where needed.

The reporting activities for each pilot correspond directly to the five tasks of the Work Package 7, thus the deliverable will be structured in a task-wise manner. Below is the description of the tasks.

T7.1 Data Journals Lifecycle Management: This task will focus on the validation of the pilot scenarios that are associated with data journals creation and management. As part of the task the five pilot sites will engage researchers in the publishing, classification and linking of experimental datasets. During the pilot operations any issues/problems associated with the data journals management processes will be identified, along with relevant suggestions for improvements.

T7.2 Research Reviews and Evaluation: This task will validate the added-value review process, which will enable reviewers and editors to have flexible and instant access to the resources required for the graceful, objective, fast and effective completion of the review process. Editors will be facilitated in selecting competent reviewers, while referees will be facilitated in accessing relevant information required to perform the review. Furthermore, croudsourcing models to the review process will be studied/piloted. The task will identify possible problems in the above processes and it will produce guidelines for realizing improvements as part of task T7.5.

T7.3 Management and Visualization of Metrics: This task will validate the scenarios and services associated with the detection of research trends and the calculation of objective user defined metrics of scientific performance. Different scenarios associated with trends and metrics will be piloted in order to assess the efficiency of the services and their ability to adapt to user requirements/needs (regarding trends and metrics). Based on the experience of the pilot operations the project will fine-tune the services on the basis of respective improvements to the operation and the integration of the underlying data mining and semantic search algorthims.

T7.4 Researchers Collaboration and Linking: This task will validate the OpenScienceLink services that will be associated with the linking, networking and collaboration between researchers and research groups. The operation of this pilot scenario will leverage the social networking and semantic search services of the OpenScienceLink platform. Researchers for all the five pilot sites will be involved in the creation and linking of researchers' networks and research groups. As part of the pilot operation of these services issues and problems will be identified, while relevant (improvement) guidelines will be documented in order to drive the services improvements in task T7.5.

T7.5 Services and Processes Improvements: This task will be devoted to the reengineering of processes associated with the pilot scenarios that will be validated in the above tasks. The task will document issues identified as part of the previous tasks and it will devise remedial actions at the process level. Process refinements will be accordingly integrated in the OpenScienceLink platform, in order to be validated and (re)assessed. Process improvements will be realized in the scope of two milestones (one nine months before the end of the projects and another three months before the end of the project).

2 Per-Pilot Operation Activities Analysis

In this section we will report the progress of every pilot and list the respective activities carried out so far.

2.1 Pilot 1 Operations

In the preparation of Pilot Procon Ltd., the publisher of the Biomedical Data Journal (BMDJ), launched the journal website, http://biomed-data.eu, agreed with consortium partners of journal policies and the composition of the BMDJ Editorial Board, as well as to waive the authors' fee for publication in the BMDJ for 2014 and 2015.

Jointly with the Editorial Board, it prepared and launched four calls for papers: three calls for special issues (one - for policy papers on open access to biomedical data, and two calls for data sets - see the table below) and one standing call. Another Call for Papers is being prepared jointly with LUHS. The four calls for papers were disseminated via the journal website, by editors and other consortium partners, and via the Wiki for calls for papers, as shown in the table below.

Editor(s)	Topic	URL at the Wiki CFP	Views by 31 July
Constantinos Pantos	Open Access to Experimental and Clinical Data	http://wikicfp.com/cfp/servlet/event.showcfp?eventid=39857	300
Yixin Zhang	High Throughput Drug Screening	http://wikicfp.com/cfp/servlet/event.showcfp?eventid=39856	342
	Standing Call	http://wikicfp.com/cfp/servlet/event.showcfp?eventid=39858	291
Alessandro Pingitore and Giorgio Iervasi	Heart Failure and Stress Response	http://wikicfp.com/cfp/servlet/event.showcfp?eventid=39859	270

Table 1: Call for papers of the BMDJ journal announced.

To be able to get indication on the interest, a Google Analytics account for the BMDJ website was set, as well as a site counter. The site of Wiki CFP also counts views (in the last column of the table) and registered users who track the respective call for papers.

Only one paper so far has been submitted to the first journal issue. Due to summer holidays, the deadline for submissions to the first issue was extended to the end of August 2014. The

deadlines for the remaining three issues are in October (a decision was made to plan for a full volume of four BMDJ issues in 2014).

2.2 Pilot 2 Operations

This pilot aims at offering a novel peer-review process methodology, which consists of the following four steps: Automated search for and suggestion of appropriate reviewers, support in carrying out the review process, organization of review form submission and post-review discussion.

The current version of the OSL platform distributes the functionality of pilot 2 between the roles of a reviewer and an editor – and between the respective tabs of the platform. The following services of pilot 3, described in D3.1, section 4.2.1, have been implemented so far:

- Issuing a review call (4.2.1.1)
- Relevant reviewer identification through literature (4.2.1.3)
- Reviewer pool suggestion (4.2.1.5)
- Reviewer selection and invitation (4.2.1.7)
- Reviewer form submission (4.2.1.10)

2.3 Pilot 3 Operations

The aim of Pilot 3 is to detect and visualize research trends in biomedical domain. The Platform integrates all pilot services under the same search tab. Hence, as in other pilots, the trend detection functionality can be queried with any textual string, be it a biomedical term, a gene name, a name of a researcher or a research organization, a location etc. After the user enters a query, the platform analyzes PubMed data sources, and the trend search results are retrieved and displayed on the same page, in a user-friendly graphical manner (see Figure 1).

The graph presents the number of published articles dealing with the specific scientific topics per year, arranged in chronological order, which also includes an estimated number for the current year. It also shows the relative research interest per year. These values are used in order to create a sweep, which is then smoothed. From the form of the sweep, it is possible can make some presumptions regarding the trendiness of the specific research topic.

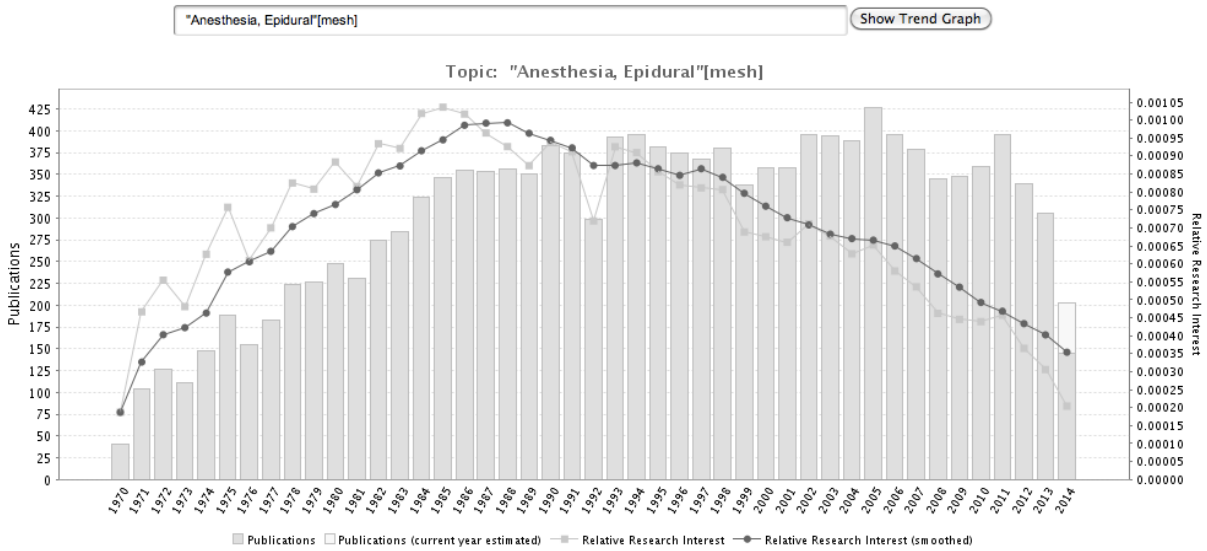

Figure 1. An example of the OSL trend graph for a query "Epidural Anesthesia".

2.4 Pilot 4 Operations

This Pilot aims at assisting the networking and collaboration of researchers and scholars working on similar scientific fields. It facilitates the creation and tracking of networks of researchers. However, a key distinguishing characteristic of this Pilot from conventional research information systems is the ability to infer relationships between researchers and research groups, including non-obvious, non-declared relationships.

A researcher logs in the Platform in order to identify researchers working on similar fields or sharing similar interests. Identification of network of researchers based on expertise and/or interest could be useful to establish new collaborations, define partners in grant proposals or organize lectures in congresses and meetings. After specifying his/her fields of interest and expertise, the Platform provides a list of suggested researchers for potential collaboration. Alternatively, without specifying fields of interest, the Platform infers the fields based on the publications of the user and provides the list of suggested researchers.

A user further wishes to identify research groups or laboratories interested in other scientific areas and fields in order to possibly expand his research or organize a workshop. In this case, the researcher specifies his field of interest to be taken into account manually and the Platform provides a list of the top authors in this field. The results are presented along with their relevant data, and the researcher can filter and sort the results based on these data and according to their personal preferences (e.g. relevance to the subfields, excellence in the field, location, affiliation, date). The results are also presented in the form of a network, where connections between different researchers are provided (see Figure 3).

The suggested collaborations among researchers are on the basis of the degree of relevance of the research topics and fields they work on, as indicated across their published work and/or their participation in research communities. The researcher can request for receiving regular notifications about suggestions of scientific collaborations with researchers, research groups and/or communities via e-mail.

2.5 Pilot 5 Operations

The aim of Pilot 5 is to introduce, produce and track new objective metrics of research and scientific performance, beyond conventional metrics associated with conventional indices and impact factors.

The current version of the OSL platform provides evaluation of the following **entities**: countries, cities, journals and authors. As with other pilots, the query term that is evaluated can be of different kinds, e.g., a research area, a scientist or an institution. The **evaluation metric** that is currently implemented is the number of publications. This metric is then visualized using the geographical data available.

Future operations on Pilot 5 will mainly focus on expanding the pilot functionality to other evaluation metrics and other entities. In particular, we are going to expand the evaluation for different research units: universities, institutes, centers, laboratories etc. In order to do so, we are currently building a partonomy of research units, taking as input the author affiliation information from PubMed citations. The partonomy is still under construction, but below is a picture that illustrates how it is structured:

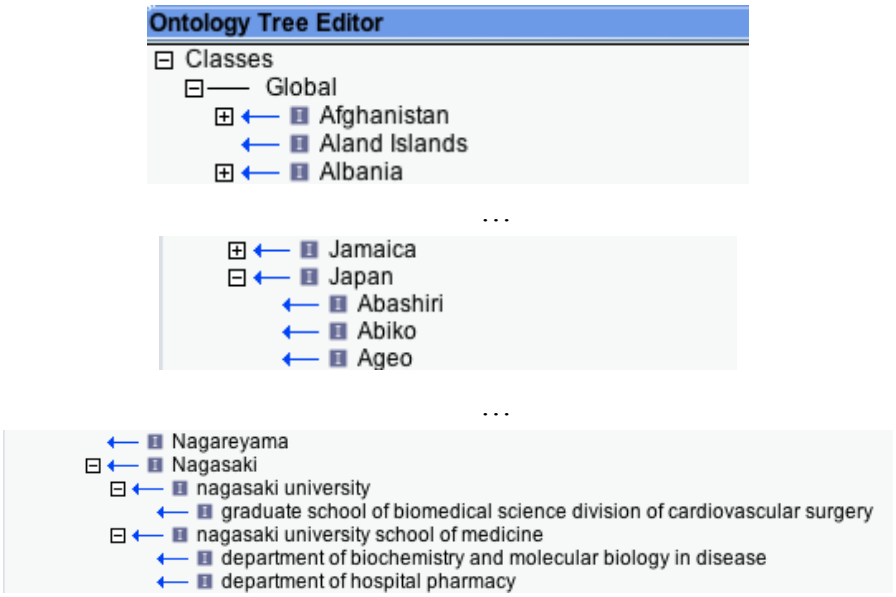

Figure 2. A part of affiliation partonomy.

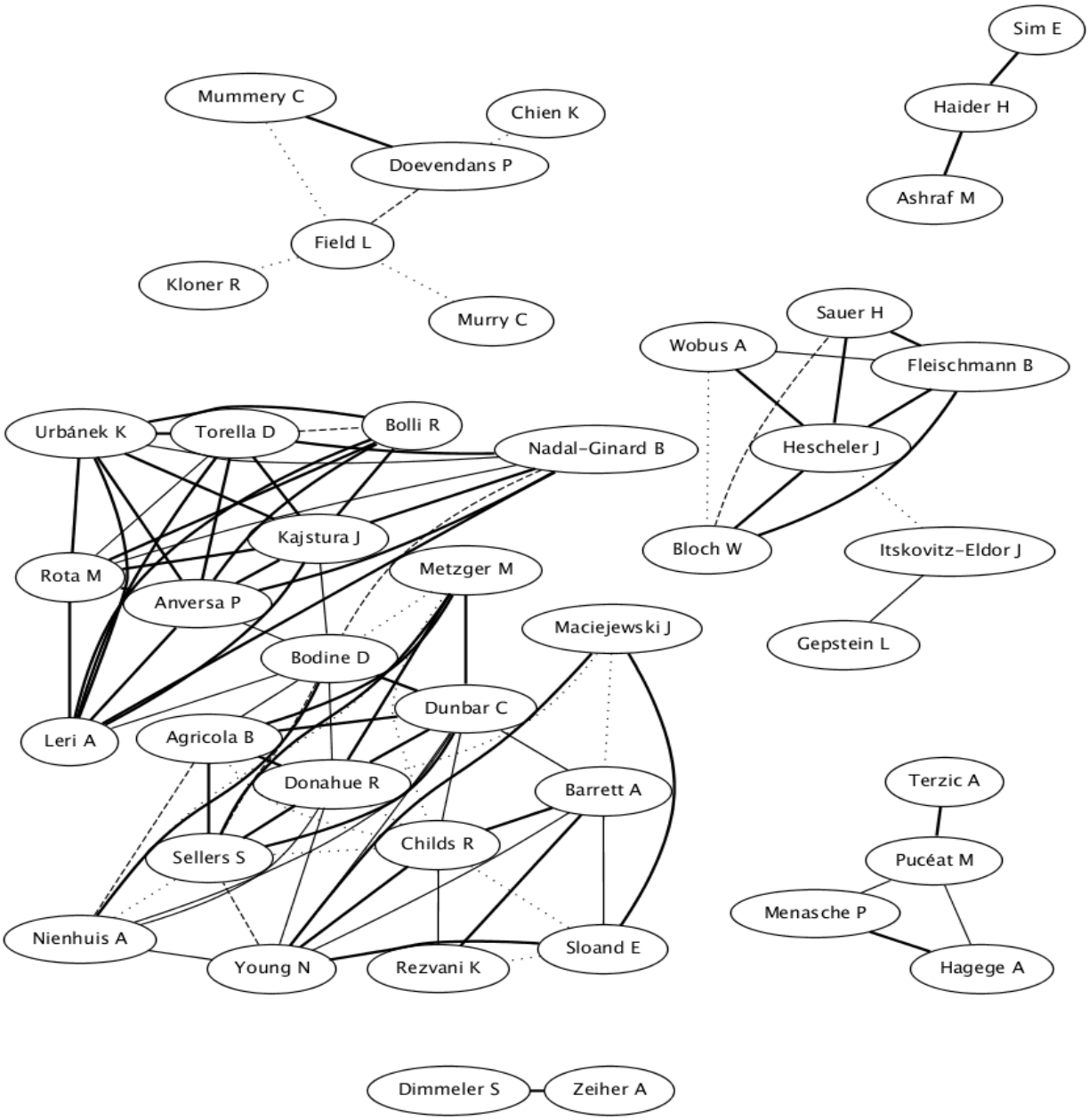

Figure 3. Network of top authors for the field "stem cells and heart".

3 Case-Study Validation of Pilots

In this section we carry out a validation of pilot activities. The section acts as a transition between the description of current pilot activities and future improvements, motivating the latter. The validation is done in a case-study manner, focusing on scenarios that involve Biomedical Data Journal (BMDJ). The starting point of every case is the same: an editor of Biomedical Data Journal wants to create a new issue of the journal. This task is complex and involves multiple subtasks, from determining the relevant issue topic, to collecting camera-ready paper versions after revisions. Every pilot case will focus on one of such subtasks.

3.1 Pilot 1 Case

Situation: The first step towards the creation of a new journal issue is *to open a call* for it. As soon as the topic of the issue is chosen (see Pilot 3 Use Case), the editor creates a description of the issue with further details about its scope, expected format of submissions etc. and publishes it as an official call for papers.

Actions: The OSL platform provides the functionality to create a new call for papers from scratch. The editor logs into the platform and goes to the "Editor Activities" tab, where (s)he can see all the calls he is responsible for. Every call has a title, submission and review deadlines, and the publication date. In order to open a new call, the editor clicks on the "Add Issue" button. The "Add Issue" page has a form with meta-information fields: title, volume, description, keywords, respective deadlines. The editor fills in the title and description fields (in our example the issue is dedicated to lymph node biopsy procedures, as it is the outcome of Pilot 3 Use Case). Based the textual data from these two fields, the platform is able to suggest relevant keywords (see Figure 4); alternatively, the editor enters the keywords himself. After all the necessary data is filled in, the editor clicks on "Save Changes" button.

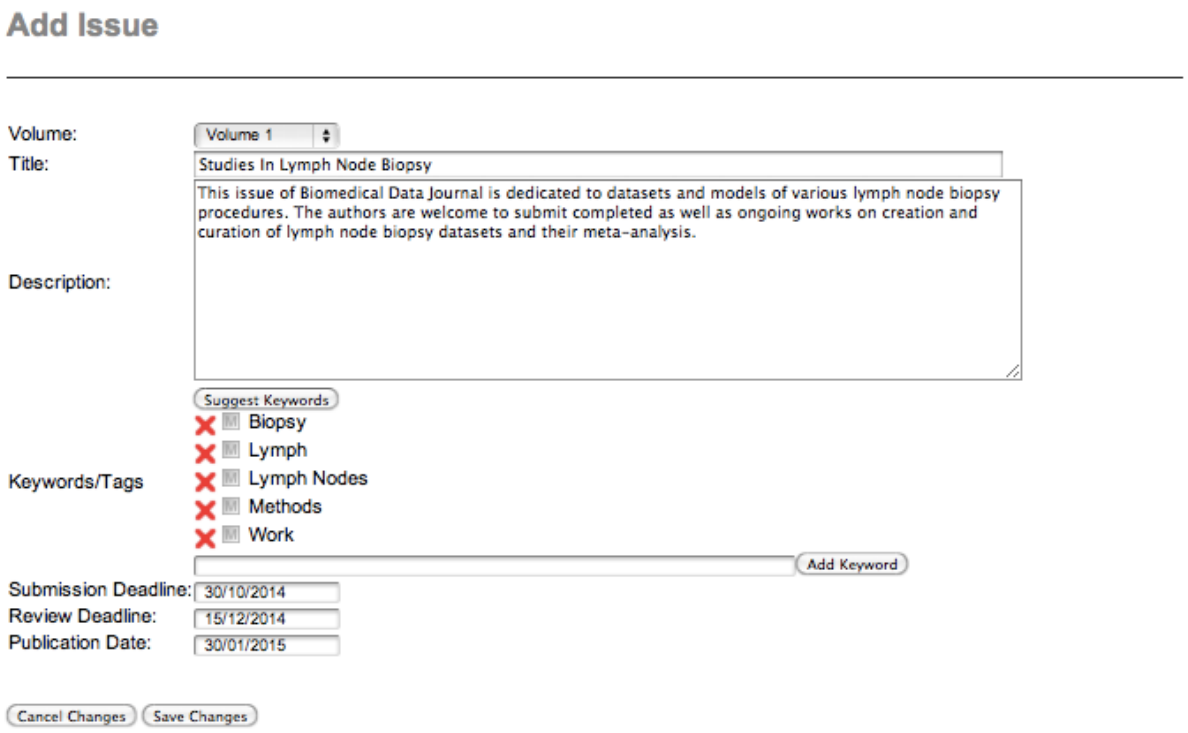

Figure 4. The "Add Issue" page of the OSL platform.

Results: The newly created call is now visible in the "Editor Activities" tab. The editor is able to modify and delete the call, as well as to see the submissions.

Challenges: So far the only drawback of the functionality is that the platform does not prevent the creation of empty calls, calls with contradicting deadlines etc. It does not assist in fixing these kinds of issues either.

3.2 Pilot 2 Case

Situation: After the call for papers for the new journal issue is published, the platform is ready to receive submissions for this call. Every submission is processed by the editor, who launches the peer-review assessment and makes an accept-reject decision based on the reviews. The complete *review process* is enabled by the OSL platform.

Actions: The user, logged in as editor, goes to the "Editor Activities" tab. For every journal issue that is then visible in the "Available Issues" list it is possible to see all the submitted datasets by clicking on the leftmost icon in the operations column. For every submission it is possible to inspect its metadata and to invite reviewers. By clicking on the right icon in the operations column of a certain submission, the editor is able to launch the review process for this submission (see Figure 5).

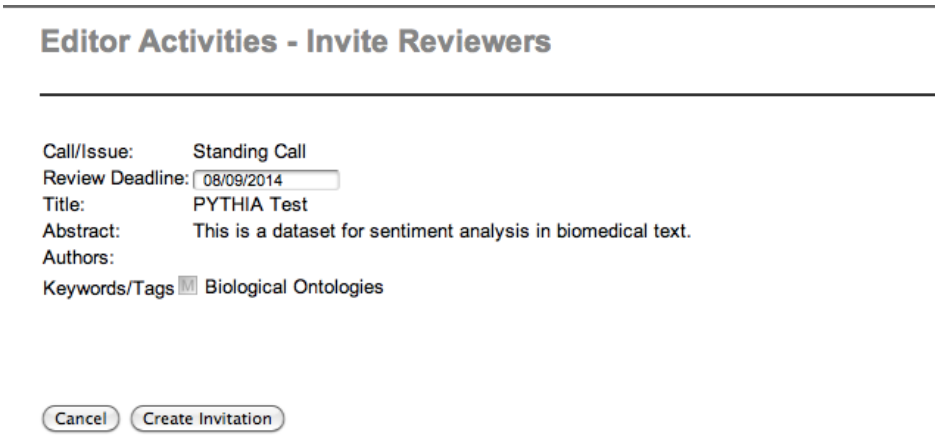

Figure 5. The "Invite Reviewers" page of a given submission.

The editor clicks on the "Create Invitation" button, and starts the process of finding people with relevant background that can potentially be the reviewers for a given submission by clicking on "Find Reviewers" button. The OSL platform returns a result list of potential reviewers with their affiliations and email (see Figure 6). The editor is able to modify, shrink and expand the original list of keywords provided by the authors of the submission, in order to improve the reviewers search. This is a type of query reformulation process in information retrieval. After several iterations the editor selects several candidate reviewers and sends them an invitation via the platform by clicking on the "Invite Reviewers" button and filling in personalized emails (see Figure 7).

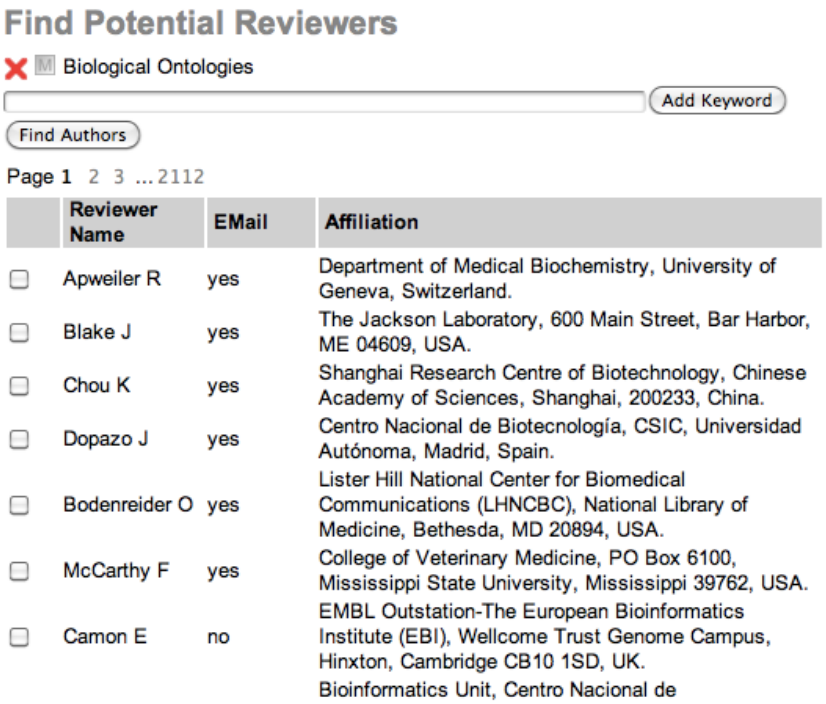

Figure 6. "Find Potential Reviewers" page with a result list of researchers for a given submission.

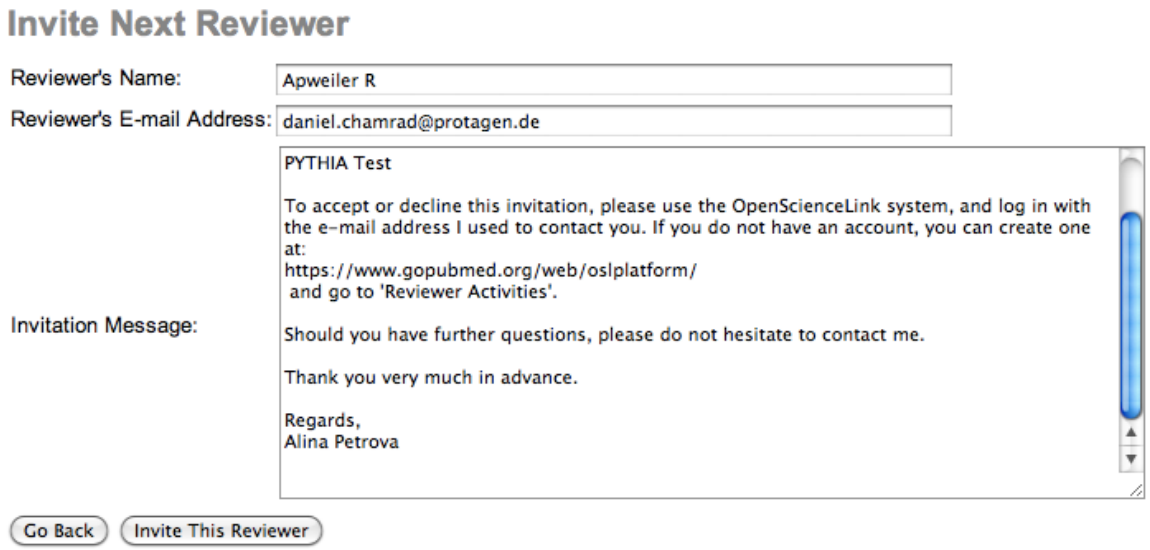

Figure 7. Sending personalized emails to potential reviewers via the OSL platform.

Results: All submissions that are considered for evaluation are processed by the editor, who assigned reviewers to each submission and is waiting for their replies: whether they accept or reject the review invitation, and in case they accept, which reviewer decision they make.

Challenges: efficient monitoring and tracking of reviewer activity from the editor perspective

3.3 Pilot 3 Case

Situation: An editor of BMDJ wants to *select a specific topic* for the new issue of the journal. The topic should either be popular and trendy at the moment, or it should belong to an area that is not yet very popular, but has been gaining popularity in the recent years. To analyse the research activity in different areas and to select an interesting topic, the editor uses Pilot 3 functionality.

Actions: The editor goes to the "Trends" tab and queries the OSL platform with various biomedical terms, e.g., names of broad areas of research or specific proteins and compounds, with institutions and centers or even single scientists, that conduct research on particular topics. The editor analyses the trend graphs for every query, in particular the "Relevant Research Interest" plots and selects the topic for the issue.

Suppose the editor is interested in studies on lymphatic system. Per se, the area attracts consistent amount of publications every year (see Figure 8), but the research interest in studying the lymphatic system in general is decreasing, which means the there are specific problems related to lymphatic system that are actively studied nowadays, and the task of the editor is to single them out. For that, the editor modifies the query in the search tab. He is then provided with context suggestions of MeSH terms that are related to the original query. One of such suggestions is "Sentinel Lymph Node Biopsy". Upon choosing this query, the editor sees the graph that clearly illustrated the research focus on this problem in the past 15 years (see Figure 9). By generalizing the query to "Lymph Node Biopsy" the editor finds the topic, which is popular and has been gaining more and more research attention in the past years (see Figure 10). "Lymph Node Biopsy" is then chosen as the topic for the new issue.

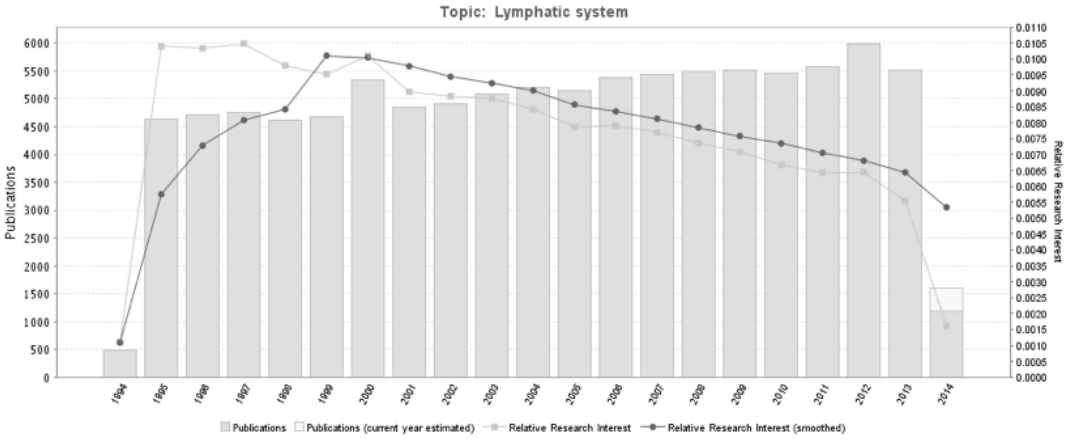

Figure 8. The trend graph for the query "Lymphatic system"

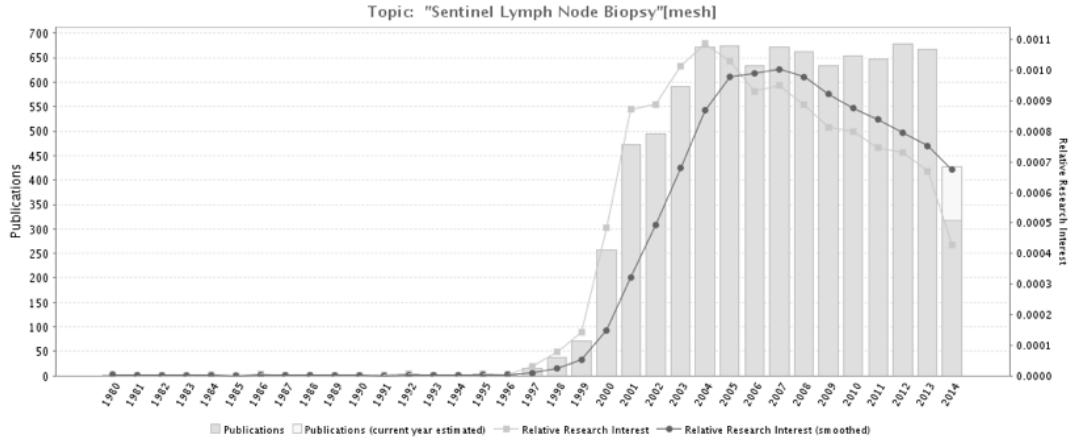

Figure 9. The trend graph for the query "Sentinel Lymph Node Biopsy".

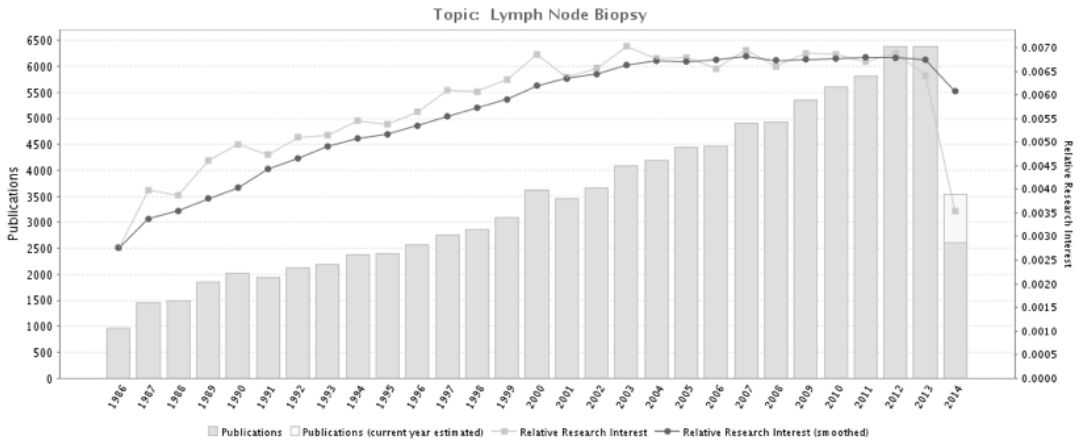

Figure 10. The trend graph for the query "Lymph Node Biopsy".

Results: The new issue is dedicated to a topic that is trendy, hence, it has the potential to attract more submissions and, consequently, to publish more high-impact articles.

Challenges: The main challenge of this case is that, while Pilot 3 provides assistance to the editor, it is still up to the editor 1) to come up with queries, 2) to analyse and compare the queries, and 3) to make the final decision. Hence, in section 4.3 we have suggested how the functionality of the pilot should be expanded in order to facilitate the decision-making process of the user.

3.4 Pilot 4 Case

Situation: In order to create a new issue of the Biomedical Data Journal, the editor needs to collect all submissions and to assess them using the peer-review scheme. As it was mentioned in Pilot 1, the platform provides assistance in finding and inviting the reviewers that are relevant to the topic of the submitted article. However, to ensure that the reviewing is unbiased, the editor who assigns reviewers to articles must verify that there is no conflict of interests involved. In particular, one should not make a positive decision about the paper only because the author and the reviewer have previously worked together. At the final stage of the platform conflicts of interests should be detected and resolved automatically; meanwhile, the editor can use the Pilot 4 functionality to check the co-authorship graph of the reviewer and to look for any of the article authors in it.

Actions: The editor goes to "Collaborations" tab and queries the platform with the reviewer's name. The platform retrieves the co-authorship graph of the reviewer. Figure 11 illustrates such a graph for Michael Schroeder. Note that since the OSL platform is using PubMed as the main source of co-authorship information, the graph below represents only the papers that belong to biomedical domain; all other papers written by Michael Schroeder and belonging to data mining, text mining etc. do not contribute to this graphs.

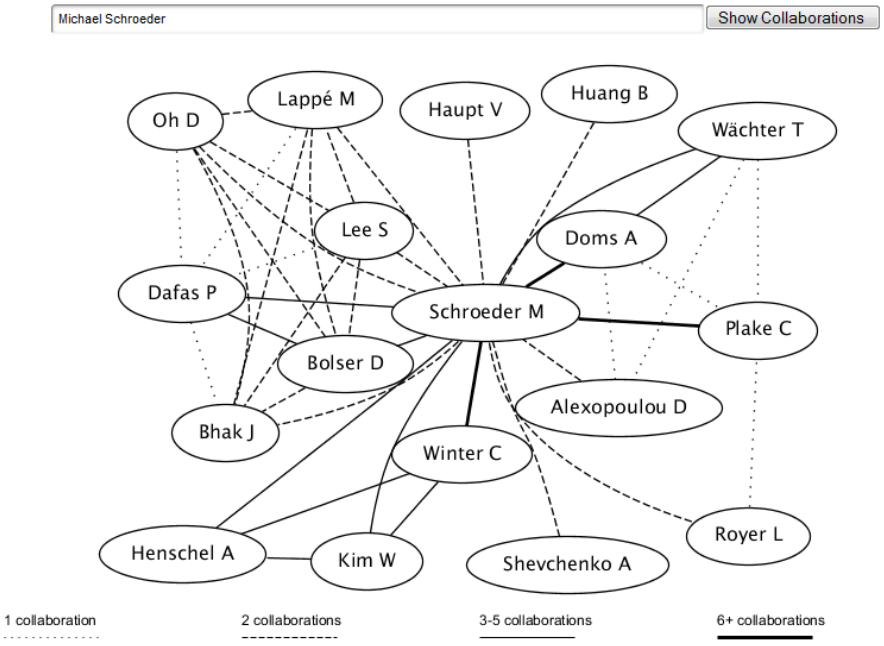

Figure 11. The co-authorship graph for Michael Schroeder.

Results: The editor checks that the graph does not contain any of the potential reviewers that he has chosen, therefore the editor proceeds with sending them official review invitations via the platform (see Pilot 2 Use Case).

Challenges: By now the conflict of interests resolution is not yet automated; the manual checking of co-authorship graph can help detect certain types of bias that exists between a reviewer and an author, but not all of them. For example, the two researchers may not have written a paper together, but they are still working in the same group, or project and are willing to help each other. These cases will be detected automatically once the affiliation partonomy is fully integrated into the platform.

3.5 Pilot 5 Case

Situation: Suppose the editor would like to include into the new issue an article from an invited author. The author could be a well-known specialist in the area to which the new issue is dedicated, and the article could be an overview of the area, or the discussion of the latest advances in the area.

However, the editor is not necessarily an expert in the topic of the issue, thus, he may need assistance in finding a candidate invited author. The Pilot 5 functionality may help him in identifying one.

Actions: The editor goes to the "Evaluation" tab and queries the platform with the main topic of the issue, in our case with "lymph node biopsy" (see Figure 12). The platform returns lists of top countries, cities, journals and authors that are connected to this topic. The editor is mainly interested in the authors list.

1 2 3 ...182

Journals	Publications	
Cancer		2,113
Ann Surg Oncol		1,764
Gan To Kagaku Ryoho		1,613
Gynecol Oncol		1,308
J Immunol		1,261
J Surg Oncol		1,058
Int J Radiat Oncol Biol Phys		882
Eur J Surg Oncol		859
J Clin Oncol		849
Anticancer Res		843
J Urol		812
Am J Surg Pathol		796
Hepatogastroenterology		728
Hum Pathol		708
Cancer Res		670
Br J Cancer		655
Clin Cancer Res		637
World J Surg		593
Zhonghua Zhong Liu Za Zhi		590
Int J Cancer		567

1 2 3 ...182

1 2 3 ...3962

Authors	Publications	
Stenmark H		96
Stahl P		80
Grunberg J		78
Sandvig K		66
Geuze H		64
Zerial M		62
Mellman I		61
Raposo G		58
Emr S		52
Parton R		52
Berg T		51
Van Deurs B		51
Pfeffer S		48
Maxfield F		47
Bonifacino J		44
Posner B		44
Willingham M		43
Collier R		40
Luzio J		39
Bakke O		38

1 2 3 ...3962

Figure 12. The journals and authors with most publications on lymph node biopsy.

For every retrieved author the editor can query the platform for his profile with email address and affiliation, as well as to check whether the author has been occupied with the given topic lately, or (s)he did this research quite some time ago. In our use case the editor goes to the "Trends" tab and queries the platform with the surname of the second author from the list combined with the topic of the issue: "Stahl lymph node biopsy". The resulting graph is given on Figure 13. As one can see from the trend curve, for the past 10 years this scientist has been actively working on the topic the editor has chosen, which makes him a perfect candidate for writing an invited article.

Results: The editor is able to identify researchers that are able to write a high-impact and insightful invited article for the new issue of BMDJ, without the editor necessarily being the expert in the topic of the issue.

Challenges: The main challenge pertains with the disambiguation of the entities, a process that is addressed by the clustering-based disambiguation of the integrated GoPubMed platform.

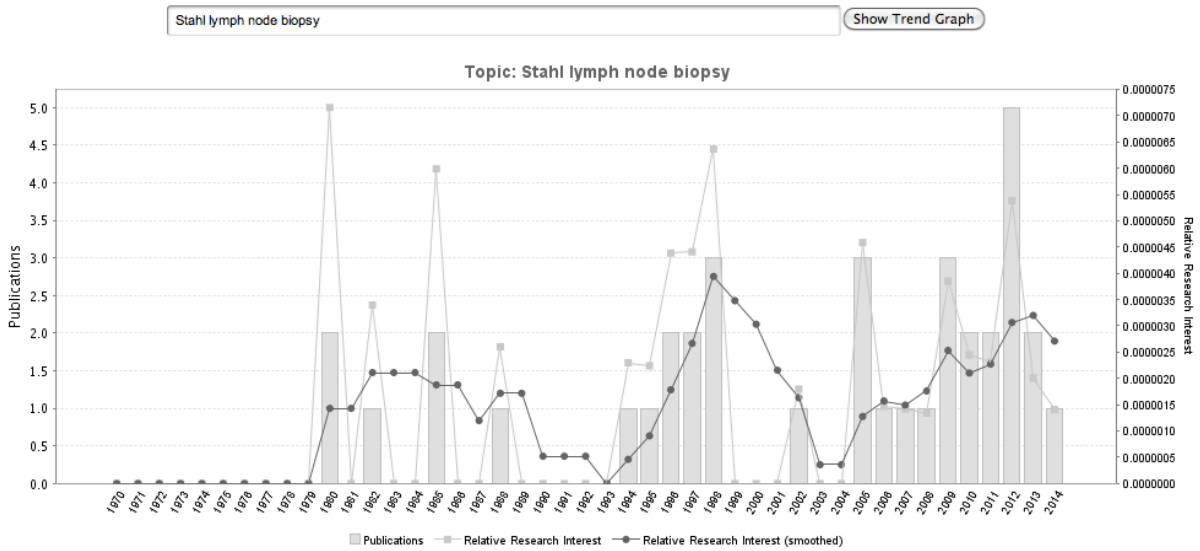

Figure 13. The trend graph for a topic "lymph node biopsy" and a researcher named Stahl.

4 Suggested Pilot Improvements

In this section we list the OSL platform improvements that should be integrated in later releases. The improvements are grouped per pilot and are linked to the respective functionalities of the platform, that stem from initial user requirements (see D3.1).

4.1 Pilot 1 Improvements

Improvement ID	Platform Improvement Description	Related Functionality ID	Related Component
I1.1	The Comment/Discussion functionality for published reviews of research works or datasets should be included in future releases of the platform.	F2.8, F2.9	Datasets Management
I1.2	Relevant datasets detection should be included in future releases of the platform.	F1.1	Datasets Management
I1.3	Datasets selection and publication should be included in future releases of the platform.	F1.3, F1.4	Datasets Management
I1.4	The functionality for specifying the papers in which the dataset to be uploaded has been used, could be improved so that the user selects the datasets rather than having to type manually their identification number.	F1.2	Datasets Management

Table 2: Pilot 1 improvements.

4.2 Pilot 2 Improvements

Improvement ID	Platform Improvement Description	Related Functionality ID	Related Component
I2.1	Conflict of interest detection should be included in future releases of the platform.	F2.3	Groups management (affiliations), Users Management, Reviews Management
I2.2	Use of author networks for reviewer identification should be included in future releases of the platform.	F2.1	Authors Management, Reviews Management

I2.3	Retrieval of related information for the uploaded article should be included in future releases of the platform.	F0.3, F2.6	Reviews Management, Articles Management
I2.4	Automated suggestion of missing references should be included in future releases of the platform.	F2.7	Reviews Management
I2.5	Automated retrieval of cited bibliography should be included in future releases of the platform.	F2.6	Reviews Management, Articles Management
I2.6	Automated retrieval of related datasets to suggest comparisons should be included in future releases of the platform.	F0.4	Reviews Management, Articles Management
I2.7	Reviews of other evaluators should be made available in future releases of the platform.	F2.9	Reviews Management
I2.8	Open discussion of reviews and review results should be made available in future releases of the platform.	F2.9, F2.10, F2.11	Reviews Management

Table 3: Pilot 2 improvements.

4.3 Pilot 3 Improvements

Improvement ID	Platform Improvement Description	Related Functionality ID	Related Component
I3.1	Sorting of topics by trendness should be made available in future releases of the platform.	F3.2	Data mining Processes, Articles Management
I3.2	A suggestion of topics by trendness (increasing or declining fields) with regard to a given set of topics should be made available in future releases of the platform.	F3.2	Data mining Processes, Articles Management
I3.3	A justification of the level of trendness (along with the relevant data) should be presented to the users in future releases of the platform.	F3.2	Web Interface

Table 4: Pilot 3 improvements.

4.4 Pilot 4 Improvements

Improvement ID	Platform Improvement Description	Related Functionality ID	Related Component
I4.1	Researchers' connections identification through social networks should be provided in future releases of the platform.	F4.1	Authors Management
I4.2	Researchers' connections identification through literature could possibly be improved by presenting detailed connections information to the end users, and enabling them to fine tune the connections identification parameters.	F4.2	Articles Management Authors Management
I4.3	Researchers' collaboration filtering and proposition should be implemented in future releases of the platform.	F4.3	Authors Management
I4.4	Research groups identification through both social networks and literature should be supported by future releases of the platform.	F4.4	Groups Management
I4.5	Research groups collaboration filtering and proposition should be supported by future releases of the platform.	F4.5	Groups Management

Table 5: Pilot 4 improvements.

4.5 Pilot 5 Improvements

Improvement ID	Platform Improvement Description	Related Functionality ID	Related Component
I5.1	More metrics should be made available for the evaluation of research work in future releases of the platform.	F5.1, F5.2, F5.3, F5.4, F5.5, F5.6	Articles Management
I5.2	More metrics should be made available for the evaluation of journals in future releases of the platform.	F5.10	Articles Management
I5.3	More metrics should be made	F5.7	Authors

	available for the evaluation of researchers in future releases of the platform.		Management
I5.4	More metrics should be made available for the evaluation of research groups or communities in future releases of the platform.	F5.8, F5.9	Groups Management
I5.5	More metrics should be made available for the evaluation of institutions in future releases of the platform.	F5.11, F5.12	Groups Management

Table 6: Pilot 5 improvements.

5 Conclusions

In this deliverable we presented the current outcomes of tasks T7.1-T7.4 in terms of the pilot operations implemented by the respective OpenScienceLink platform services. The report detailed the validation of the five main pilot scenarios of the project. In addition, it reflected the outcome of task T7.5 by illustrating the suggested improvements for the five pilot scenarios of the project, coupled with the respective rationale that led to these suggestions. As a result, the current document, along with D5.2.1, will constitute the basis for the improvements of the five pilot operations of the project and the respective OpenScienceLink platform services.

6 References

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

OpenScienceLink D3.1, Revision 1. "Detailed Specification of OpenScienceLink Pilot Scenarios and Services".