

Coordinated Research Infrastructures Building Enduring Life-science services - CORBEL -

Deliverable D4.2

Sustainable plan for user access to common RI services for 4 use case cross-ESFRI BMS research infrastructure pipelines

WP4 – Community-driven cross-infrastructure joint research - Bioscience

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Contractual delivery date: 31 August 2018

Actual delivery date: 12 December 2018

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Grant agreement no. 654248

Horizon 2020

H2020-INFRADEV-1-2014

Type of action: RIA

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Executive Summary

Since the beginning of the CORBEL project, work in WP4 has focused on the establishment of common service pipelines between multiple RIs in the biosciences. The mission of this WP is to help users to progress further with advanced research projects in need of a diverse set of technologies and services. Established pipelines between service providers were tested and refined in several rounds, starting with VIP projects, then opening up the services to the general scientific community via two Open Calls. Considering the complexity of the envisaged projects, the high application numbers in both Open Calls demonstrate the need for combined service provision very clearly. To secure a leading role for Europe in biomedical research and to ensure the technological support needed for cutting-edge scientific projects, it is indispensable to develop mechanisms that will maintain access to these service pipelines also beyond CORBEL. This deliverable exposes key aspects that are required to offer joint service provision. It details which measures are needed to sustain service pipelines between BMS RIs, and which pipelines are the ones that were requested most by the user community. These pipelines are expected to bear the highest potential for innovative discoveries.

Project objectives

This deliverable has contributed to the following objectives:

- a) Start to establish an infrastructure platform that integrates services for life science and support scientific research projects that require joint services between different ESFRI BMS RIs
- b) Start to build cross-ESFRI BMS infrastructure pipelines according to specific use case objectives
- c) Start to build the framework for transnational open user access for the sustainable use of the shared services

Detailed report on the deliverable

Background

Scientific projects in the field of biology and medicine are becoming increasingly complex and interdisciplinary, and require the combined use of high-end and cutting-edge technologies. As most scientists across Europe either are not experts in all of the technologies they would like to implement in their project or do not have access to all of the desired technologies in their direct vicinity, European BMS RIs have the capability to fill this gap. Their respective services are tailored to this emerging need of the community. In this WP, the goal is to realize excellent support to scientific projects not only by one individual research infrastructure, but by several of the RIs. Therefore, this WP aims to facilitate access for the scientific user community by establishing a platform of shared services between the RIs. Through pilot projects, WP4 ensures that scientific projects fully exploit the joint potential of the eight involved BMS RIs (BBMRI-ERIC, ELIXIR, EMBRC, Euro-BioImaging, EU-OPENSOURCE, INFRAFRONTIER, Instruct, ISBE) through the development of scientific connectors in partnership with advanced users. Requirements, feedback and testing by the external partners drove the development of these shared services and contributed to the ideas presented in this deliverable on how to make such services sustainable.

Description of Work

Learning from pilot users

In D4.1, we developed a strategy for enabling user access within pilot use cases, which entailed a two-step process. The first step consisted of so-called VIP projects, which were run by scientists that were directly approached by WP4 partners. These projects therefore were built on already pre-established contacts and were not subjected to a scientific review process, but their selection enabled an early start of service provision. As we recognized the importance of an unbiased process for selection of scientific pilot projects, we introduced the organization of an Open Call for Advanced Research Projects as a second step. This Open Call included both a scientific review as well as a technical feasibility check done by the requested service providers in the respective RIs. The Open Call led to an increased visibility of CORBEL and the participating RIs, and was very positively received by the scientific user community. Out of 30 eligible project applications, 21 passed both review steps and were invited to start their work with the requested service providers. At the CORBEL midterm review, the Open Call was highly appreciated and CORBEL received subsequently the recommendation to run a 2nd edition, to allow more scientists to take advantage of open access to common service pipelines. As some of the service providers had been heavily requested already and were close to reaching their capacity limit, and as the travel grants supporting user projects should benefit projects with high potential for successful completion, WP4 asked for updated work plans from all ongoing VIP and Open Call user projects. These work plans enabled us to improve the planning of resources and resulted in the termination of a few projects, where achieving the expected goals became unlikely over the course of the project work.

Before launching the 2nd Open Call, the highest priority was to learn where processes of common service provision could be improved and to adapt procedures according to the needs of both users and service providers. Two main activities helped to collect the information needed. Firstly, WP4 organized a meeting in January 2018 to create an opportunity for service providers and users to come together, network and discuss project ideas. Presentations and a panel discussion provided a platform to learn from other projects about their strategies and challenges to successfully guide the user through the pipeline of service providers. This meeting stimulated intense discussions about key factors that can contribute to a smooth service pipeline, it enabled the creation of strong links between RI staff members and it created in some cases new partnerships between users and service providers. For service providers, it was a valuable opportunity to increase their knowledge about service portfolios and thematic expertise in other RIs. This knowledge is crucial for providing guidance and advice to the own user community on how to take a project further and which additional services and technologies could be suitable for addressing a scientific question.

The second important activity in WP4 to collect feedback on the Open Call processes was a survey that was both answered by the Open Call users as well as by the service providers. Striving for continuous improvement, WP4 partners wanted to learn from the experience with the 1st Open Call and to implement changes wherever desirable and necessary. The survey addressed two main aspects, namely the application process and the use of ARIA as application management tool and came in two versions tailored either to the users or the service providers. Additional surveys will be run later in the project to also gain a better understanding of the success of individual projects, how to further improve trans-RI service provision, and on the overall impact of the CORBEL project. The full survey targeted to the Open Call service providers is available in the appendix from page 14 on, the one targeted to the Open Call users from page 28 on.

Identification of most requested service combinations

At the time of writing this deliverable, the last round of the 2nd Open Call is still ongoing (closure: 31 December 2018). However, already at this stage it is possible to discover certain patterns in the combination of services in project applications submitted during the 1st Open Call (closed) and the 2nd Open Call (ongoing). Considering all eligible project applications and the desired combination of RI services, based on user demand, reveals that certain pipelines were more heavily asked for than others. Certain technologies obviously seem to build upon each other, so that logical pathways emerge, involving the same two RIs in a certain project. Also, the scientific field dictates combination of RIs, as e.g. seen in the drug discovery field, where chemical compound screening offered by EU-OPENSOURCE is often requested in combination with high throughput microscopy, offered by Euro-BioImaging (EuBI). Similarly, high-end biological imaging (EuBI) in combination with NMR data or support in EM data analysis in 3D (Instruct) was in high demand. An overview of all requested combinations of two RIs is shown in Figure 1.

It should be emphasized that a scientific project requesting a frequently used combination of services and technologies is not *a priori* a more valuable project. However, as we aim for impactful and sustainable service provision for the benefit of many researchers, we suggest a specific approach tailored to especially those pipelines that are often asked for. We therefore encourage the development of bilateral collaboration agreements between RIs that are often requested in combination, as further detailed in the following section "Outcome and Recommendations".

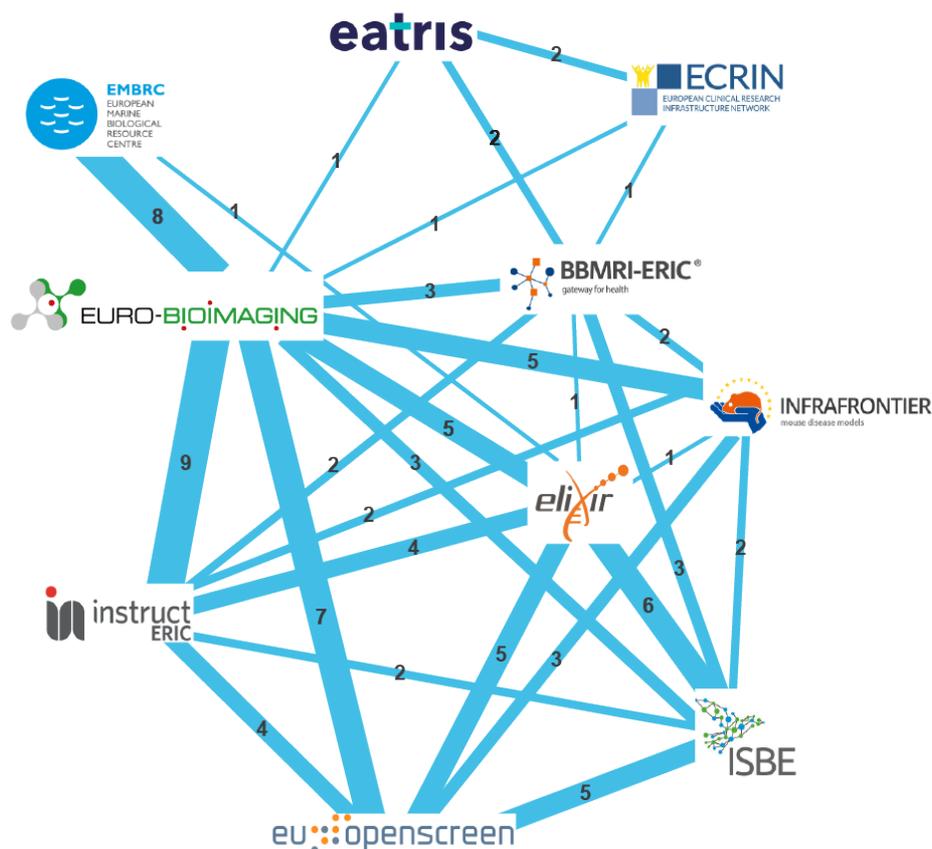


Figure 1: Pipelines between two BMS RIs based on user demand. All eligible Open Call applications (in total 51) considered (status: 23.11.2018).

Please note, EATRIS, ECRIN and certain services from BBMRI were not part of the 1st Open Call and joined in Access Track 5 for the 2nd Open Call launched in March 2018 only.

Outcome and Recommendations

Based on the experience of service providers, scientific users of RIs, Open Call project managers, and other stakeholders, three main aspects emerge as key to offering service pipelines across BMS RIs and to enabling a sustainable service provision beyond the lifetime of the CORBEL project.

1. Common access management system and web presence

For managing the user applications to the Open Call, WP4 collaborated closely with WP5, which provided the ARIA software (developed by Instruct) fit for this purpose. Thanks to the very close interaction between WP4 and WP5, a continuous adaptation and improvement of ARIA was achieved, and will also continue for the rest of the CORBEL project. ARIA was further developed for the specific requirements of applications spanning multiple RIs, as for example the set-up of specific Access Tracks between predefined service providers and custom-made evaluation and feedback forms. ARIA allows users, administrative managers, service operators and reviewers access to a certain, predefined set of information, and enables the storing of the most relevant information on a certain project in one central place. The ARIA messaging system allows sending messages to certain project members with defined responsibilities, and helps to share information across large teams. Management of applications submitted by users that would like to work and collaborate with several RIs would be a lot more complicated without the use of ARIA as common management system. ARIA has not only proven useful from the perspective of managers of such cross-RI projects. Using ARIA as entry portal to multiple RIs also facilitates application submission for the user, as survey results show the appreciation by many users for having to submit only one application to one system, in contrast to multiple applications across different, RI-specific systems (user survey in the appendix, question 12 and 13).

Of note, several RIs next to Instruct have shown interest in adapting ARIA as their own access management system (Euro-BiolImaging, EMBRC, EU-OPENSREEN). Uptake of the same application system by multiple RIs helps to lower the entry barrier for users, as familiarity with the software increases over time and contributes to the ease of use. In addition, future scenarios also foresee that projects enter via one individual RI, but during the course of the project work, the need for additional RI support becomes apparent. Extending the already existing application, involving additional service providers for technical review and hand-over of application data would be facilitated if the respective RIs relied on the same access management system.

In parallel to implementing the ARIA system for application management, the CORBEL Open Call web page was created by WP2 and WP4, and served the purpose to introduce prospective applicants and the scientific community in general to the service portfolio available in the Open Call. On the website¹ visitors can learn about the expertise available at the different service providers, can find relevant contact details and introductory explanations on the offered technologies and services. In addition, access procedures, evaluation criteria, time lines and opportunities for financial support are introduced. Success stories on previous projects help to illustrate how user projects can benefit from the support offered via the Open Call. The survey results showed high appreciation by the users for finding all relevant information on the participating RIs in one location (user survey in the appendix, question 11). Interestingly, also service providers strongly benefitted from the information provided on the web page, as it helped to increase their knowledge about the remit and service portfolio of the other BMS RIs (service provider survey in the appendix, question 2).

¹ <http://www.corbel-project.eu/open-call.html>

In summary, maintaining the already existing ARIA procedures and forms as implemented for the 1st Open Call and improved in the 2nd Open Call is considered of high relevance. The survey outcome also emphasises the need for a common web presence of the BMS RIs, where users can find the most relevant information on their service portfolio in one location. Maintenance of both the ARIA system as well as the website spanning multiple RIs will require future effort and the resources that can support this work still need to be identified. In-kind contributions of BMS RIs can cover this only to a limited extent. Continuation of this work, however, will contribute fundamentally to the sustainability of a platform of common services among the BMS RIs.

2. Common contact person

As detailed above, a lot of care was given to the provision of information via the Open Call web pages as well as via ARIA, and all outreach material for advertising the Open Call was drafted with similar attention to detail. Nevertheless, WP4 project managers as organizers of the Open Call were contacted by more than 70 scientists interested in applying to the 1st or the 2nd Open Call to clarify questions. These questions covered a multitude of different topics, including information actually provided on the web pages. Most of the time, however, the personal contact was essential and provided significant advantage for the scientists. Often, the initial contact developed into longer communication. The Open Call managers helped to identify appropriate technologies to address a scientific question, to find the most suitable service provider to support a certain project, or to clarify specific aspects of the service provision (access model, IP issues, funding, etc.). They also supported users when advice on the application process in ARIA was needed and established the contact to the ARIA helpdesk whenever necessary.

The survey showed high appreciation for this common contact point both by users as well as service providers (user survey in the appendix, question 6 & 7 and service provider survey in the appendix, question 6 & 7 & 8). Statements like the following highlight the importance of personal contact, as questions still arose despite the information provided on the website: “Yes, it was helpful to contact the project manager and to know more clearly about the infrastructures available” or “I contacted the managers multiple times to ask for information and to have their support and I always received an answer in brief time and with a solution to my question.” Some users who did not contact the project managers before application submission, retrospectively realized how beneficial such contact could have been.

The project counselling role of the Open Call managers did not end with the successful application submission, but was continuously utilised during the ongoing project work. Open Call managers acted as intermediary between users and staff members at various service providers, less on the level of technical expertise but rather at the administrative and communication level. Advice ranged from payment instructions ensuring eligibility of the costs, establishing contact with new service providers joining the project at a later stage, to explaining access modalities including aspects as IP rights, acknowledgement of contributions, or data ownership.

These examples show that a common contact point at the interface of multiple RIs fulfils a range of different roles, and is crucial in the successful management and guidance of projects of such complexity. Importantly, this contact person needs to act at a meta-level, establishing a bridge between different RIs, different service providers and different technologies. This activity requires experience and training. A simple catalogue of services, or an AI-based algorithm can support certain aspects of this project counselling (e.g. an appropriate choice of technology based on the scientific question), but would fail in many other aspects that require the personal dialogue.

3. Bilateral collaboration agreements to sustain frequently requested pipelines

We consider it of particular importance to strive for sustainability of the pipelines that were commonly requested by users, as we recognize their value for the scientific user community. In CORBEL, 8 RIs and 10 RIs, respectively, combined their potential and offered common services in the 1st and the 2nd Open Call. The funding that was provided by the CORBEL project allowed us to establish the pipelines, to test common applications processes and service provision and to channel users from one RI to the next. Beyond the CORBEL project, it will not be feasible to maintain all potential pipelines and to continue with the same elaborate service provision without any further financial support. Therefore, efforts should be concentrated on the sustainability of at least part of the service, logically the services that were requested most. In addition to the sustainability measures outlined above, WP4 therefore suggests to develop bilateral collaboration agreements (CAs) between BMS RIs, whose service portfolios appear to be strongly linked to each other, based on our experience, and where users could benefit from stronger collaboration between these RIs. Besides processes for common service provision, the CAs can also include aspects such as staff exchange programs, joined outreach activities, and the identification of potential funding mechanisms for supporting access of the shared user base.

As part of this deliverable, WP4 provides the template for a CA in the annex, and invites all BMS RIs to make use of this template as a starting point. The CA template is based on several examples, either between European BMS RIs or between infrastructures wishing to collaborate on a global level. It should not be understood as legally binding contract between RIs. It can - and should be - developed further into a CA suitable for their own purposes. All RIs are encouraged to engage in a bilateral dialogue with their obvious partner RIs. Currently, some of the BMS RIs have CAs in place already or in preparation (e.g. Instruct – EuBI, EMPHASIS – ELIXIR, EuBI – ELIXIR), but some of them might be outdated or with a different focus than common service provision. For this reason, we believe that the template can provide some guidance in many cases, and we recommend considering a CA especially between RIs that were often requested in combination by the users.

In short, analysing the requested pipelines between BMS RIs based on user demand has shown that the maintenance of certain pipelines will provide major added value for the user community. Beyond the lifetime of the CORBEL project and without further common funding for enabling user access, it will be in the hands of individual RIs to sustain these individual pipelines across RIs. Defining common goals and united efforts to continue joined service provision via bilateral CAs can be an essential step in this direction.

Conclusions and Next steps

With the end of 2018, the 2nd Open Call will also come to an end. When closing the application phase, the final numbers of eligible projects and requested pipelines will be available and updated accordingly in future documents. A lot of attention will be given to all ongoing projects and to reaching a successful scientific outcome by the end of the CORBEL project. WP4 will aim to identify ways for maintaining a common contact point between RIs and will encourage the maintenance of ARIA for future applications across BMS RIs. WP4 will also encourage interested RIs to sign a bilateral CA, and will engage in joint activities to realize future funding opportunities in support of highly requested service pipelines, striving for actual long-term sustainability of combined service provision.

Abbreviations

BBMRI-ERIC: Biobanking and BioMolecular resources Research Infrastructure
BMS RIs: Biological and Medical Science Research Infrastructures
BRFAA: Biomedical Research Foundation of the Academy of Athens
CA: Collaboration Agreement
CORBEL: Coordinated Research Infrastructures Building Enduring Life-science services
CNRS: Centre National de la Recherche Scientifique
CRG: Centre for Genomic Regulation
CIRMMP: Consorzio Interuniversitario Risonanze Magnetiche di Metallo Proteine
CSIC: Agencia Estatal Consejo Superior de Investigaciones Cientificas
DKFZ: Deutsches Krebsforschungszentrum
EMBL-EBI: European Molecular Biology Laboratory-European Bioinformatics Institute
EMBL: European Molecular Biology Laboratory
ESFRI: European Strategy Forum on Research Infrastructures
FVB: Forschungsverbund Berlin e.V.
HMGU: Helmholtz Zentrum München für Gesundheit und Umwelt
ICFO: Fundacio Institut de Ciencies Fotoniques
INSTRUCT: Instruct Academic Services Limited
ISBE: Infrastructure for Systems Biology in Europe
MDC: Max Delbrück Center for Molecular Medicine
UMCU: Universitair Medisch Centrum Utrecht
VUA: Vrije Universiteit Amsterdam
WP: Work Package
SZN: Stazione Zoologica Anton Dohrn

Delivery and schedule

The delivery is delayed: Yes

Original delivery date of this deliverable D4.2 was August 2018. To align this deliverable with the end of the 2nd Open Call, the delivery date was postponed to 31 December 2018. This enabled us to first collect most of the user applications and to base our sustainability plan on user requests. The postponement was accepted by the EC project officer.

Adjustments made

In the 2nd amendment, the organization of a 2nd Open Call was integrated into the description of work for WP4.

Appendix

Appendix 1: Collaboration Agreement template



Template for a bilateral Collaboration Agreement between BMS RIs

This document recognises the desire of the two BMS RIs XX and YY to offer joint service provision to the European scientific life science community and to contribute to the sustainability of such combined service provision. XX and YY acknowledge the value and importance of their own field of expertise being embedded in a wider range of technologies and services offered by complementary BMS RIs across Europe. Harmonizing and facilitating access across BMS RIs will increase the user base of the individual RIs, enable cutting-edge research projects, and drive innovation and scientific progress.

1. Preamble

Building on the experience gained in common service provision in the H2020 project CORBEL, the two RIs XX and YY want to continue their interaction on research projects spanning their respective fields of expertise. Past user applications have demonstrated a clear need for scientific expertise and technological support offered as combined service between XX and YY, implementing e.g. *[example of typical service combination]*. This experience highlights the necessity for support not only being offered by single RIs in isolation, but by a strong team consisting of members being experts in various technologies. With this bilateral collaboration agreement, XX and YY would like to formalize their collaborative service provision to make it sustainable.

2. Description of the partners XX and YY

XX

[Description RI XX, approximately 200 to 300 words]

YY

[Description RI YY, approximately 200 to 300 words]

3. Goals and Objectives of Collaboration

Modern research is often interdisciplinary and asks for the combined use of technologies, which are offered at individual RIs that have built up their specialized expertise over years. The CORBEL project has demonstrated a clear need in many projects for scientific expertise and technological support not only offered by single RIs in isolation but by a combination of several ones. In particular, XX and YY were regularly requested to contribute to the same project, as their technologies often built upon each other and offer a logical experimental

workflow. [*Short description of a potential project of common interest, where technologies built upon each other*]. XX and YY can facilitate and harmonize such workflows by working seamlessly together to enable faster project output, reproducible results, and generation of new knowledge.

This Collaboration Agreement aims at a continuation of the collaborative work established via the H2020-funded project CORBEL, with a particular focus on identifying sustainable funding mechanisms to guarantee a long-term alliance.

In the following, specific goals and objectives of this Collaboration Agreement between XX and YY are listed. Both partners aspire to:

1. Recognize the value and leading expertise of each other in their respective field of service provision, which includes a basic understanding of the technologies and services that can be offered to the respective user community
2. Share best practice in the areas of user access and user experience, training, data management, RI operation, RI management and stakeholder reporting, as relevant for RIs in the field of biological and medical research
3. Harmonize the pathway for applicants to access the different RIs, including application procedures, evaluation forms, project counselling etc.
4. Diversify the portfolio of supported projects by recommending complementary and consecutive technologies as offered by the other RI to the RI's own user base
5. Identify sustainable funding mechanisms to support advanced research projects requesting access to both RIs to support the shared user base also with the realization of funding opportunities to conduct such work- and resource-intensive projects
6. Increase the visibility of both RIs jointly and also in their own user community typically not familiar with the service portfolio offered by the other RI

4. Mechanism of Collaboration

This Collaboration Agreement reflects the intention of XX and YY to collectively collaborate and co-operate to achieve joint objectives related to enabling user access to common service pipelines such as, but not limited to, the following:

1. Exchange (visits) of RI operational and managerial staff to gain insight into operational practises at the other RI and to benefit from evaluating the own performance against other RIs. Administrative support to facilitate these visits will be provided by both XX and YY members
2. Advising potential users about the service portfolio offered by the other RI to compliment the technologies already applied in the user project. This implies that RI staff is knowledgeable enough about the other RIs' service portfolio to be able to recognize opportunities beneficial to the scientific question. In-depth advice can only be expected from staff working in the respective RI
3. Advising potential users about funding sources available specifically via the own RI or via other funding mechanism
4. Promotion of the RIs both collectively as well as individually at relevant events, such as conferences and workshops targeted to the own user community or participants with diverse background. Organization of common RI sessions at larger conferences with broader background are beneficial for all participating RIs due to the shared costs and the higher number of attracted participants
5. Advertising items of particular interest to both user communities (e.g. courses, open calls, job offers, funding opportunities) on the respective websites and thereby linking to each other

6. Providing support for projects interested in making the transition from one RI to the other by providing basic information, establishing the contact, supporting data transfer and participation in project team discussions
7. Allowing a fast-track for projects previously scientifically evaluated by the other RI, if the information content in the application is sufficient for subsequent technical evaluation by the consecutive RI
8. Striving for interoperability and compatibility of access procedures. This includes but is not limited to aspects as scientific and technical evaluation, privacy policies, confidentiality, user surveys, and access management software.
9. Providing staff resources in kind to manage user access and to offer counselling services to the common user community. Without external funding from cluster projects and other sources, the individual RIs aim to incorporate the support for cross-RI projects into their regular workload for their own user base as much as available resources allow.
10. Developing a strategy for realizing funds for interdisciplinary projects of common interest and seeking to ensure sustainable operation of common service pipelines

5. Terms of Collaboration

This document can be modified, amended, expanded or reduced by mutual agreement between XX and YY or by the provision of six months written notice by either party. This document is not intended to create legal or binding obligations on either party. It serves only as a record of the parties' current intentions.

The collaboration described by this agreement is non-exclusive and each party is free to engage with and enter into strategic partnerships for common user access with other institutions or organisations.

Additional agreements may be developed between XX and YY to foster joint user access and research infrastructure activities that may commence as a result of this Collaboration Agreement.

This Collaboration Agreement is effective from the date of signing until XX Month 20YY unless terminated at an earlier date by mutual consent.

6. Conclusion

Signatures:

Date and Location

Representative XX

Date and Location

Representative YY

Appendix 2: Survey Results - Service Provider



Survey Results – Service Provider

Part I



BACKGROUND

At the end of 2016, CORBEL organized the 1st Open Call for Research Projects. It generated a lot of interest among European scientists and attracted over 30 project applications. Among all eligible projects, 21 were finally accepted as CORBEL user projects, following careful scientific and technical evaluation.

Users had the opportunity to get open access to a wide array of technologies and services from the fields of biological and medical sciences. They had to request access to at least two BMS RI to be eligible.

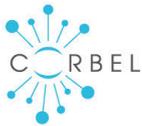
As the 1st Open Call was very positively received by the user community, it was decided to launch a 2nd Call. Striving for continuous improvement, we wanted to learn from our experience with the 1st Open Call and to implement changes wherever desirable and necessary. The following survey addresses two main aspects, namely the application process and the use of ARIA as application management tool. Additional surveys will be run to also gain a better understanding of the success of individual projects, how to further improve trans-RI service provision, and on the overall impact of the CORBEL project.

The survey was answered by 17 out of 21 participating service providers. For technical issues, Question 9 could only be answered by 5 instead of 17 service providers. Answers are shown as pie-chart diagram to illustrate the relative distribution of responses. In some cases, multiple selection was possible as indicated in the respective question. Some responses consisted of free text field. For simplicity, some responses were shortened, rephrased or deleted in case of multiple similar answers.



Section 1

Application Process



QUESTION 1, SERVICE PROVIDER

Please comment in general on the content of the CORBEL Open Call webpages. Let us know how we could improve?

Very well structured. Users and Service providers should be able to find what they are looking for. Maybe the announcement of the next open call could be placed more prominently on the "home"-page of CORBEL.

Structure is fine but information on what is funded and what not was not clear.

The Technologies and Services section is informative and intuitive to navigate. Overall, however the homepage features too much information. The subdivision into access tracks makes navigation difficult and confused applicants.

The services provided by the various facility are well described. Would be maybe of interest of users to increase the application examples, that could be collected also in a different section (e.g. success stories from the call)

It can be a nice idea to add example projects from the previous round. Also the access tracks can be represented in a horizontal manner. Currently it is quite easy to miss Access Track 3 and 4.

The page is extremely well structured, and every piece of information can be found there. A FAQs page is missing and it could be useful. Maybe for the following calls, it will be useful to have a more active participation in terms of guiding the applicants in finding the appropriate RIs and in supporting the interconnection between the different RIs. We feel that, although these two aspects were carried out well, the RIs had a passive role.

It would be good to have a link to the detailed description of each project. I can only find the names of the successful applicants. Please can we have all documents relevant to each project linked from the same place. Some indication of the current progress of each project would also be useful to see where any bottlenecks might be.

The content of the CORBEL Open Call webpages seems correct, very complete and easy to use. Great work

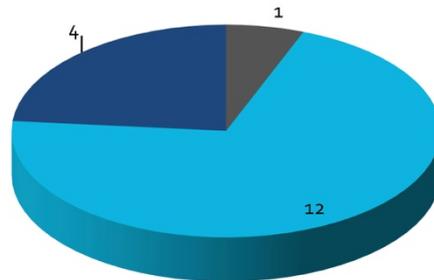
Bringing the different groups and service providers to a central networking point is an important initiative, and in general I very much like the approach that Aria is taking toward that end.

I think the web pages were quite well designed. The potential users would have had to spend some time navigating to find what they were interested in, but I think this is inherent in the nature of a project with partners as diverse as CORBEL, and I don't see that this would have been a serious problem.



QUESTION 2, SERVICE PROVIDER

The most important information about all involved RIs and service providers was presented on the Open call webpages. Did this increase your knowledge about the service offers of others partners?



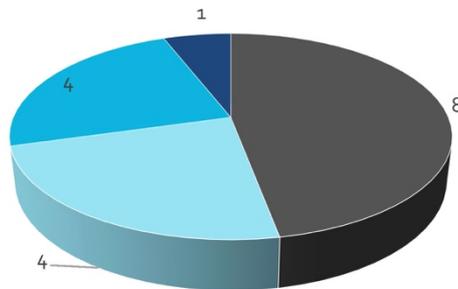
- No, I was already quite familiar with the service offers of other RIs
- Yes, I discovered services I was not aware of
- Yes, I learned a lot about other RIs and service providers

Additional response option (not selected):
No, I could not find the information about the other RIs



QUESTION 3, SERVICE PROVIDER

Were you directly contacted by potential users prior to their application?

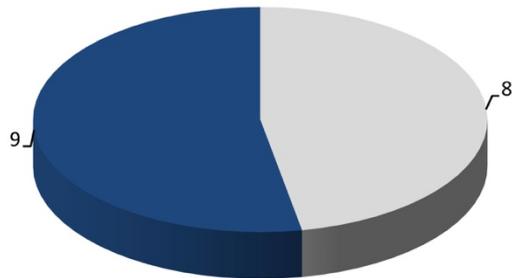


- No, none of the applicants requesting our services contacted us prior to their application.
- Yes, less than 50% of the applicants requesting our services contacted us prior to their application.
- Yes, more than 50% of the applicants requesting our services contacted us prior to their application.
- Yes, all applicants requesting our services contacted us prior to their application.



QUESTION 4, SERVICE PROVIDER

If applicants contacted you prior to their application, did you appreciate these discussions about prospective projects?



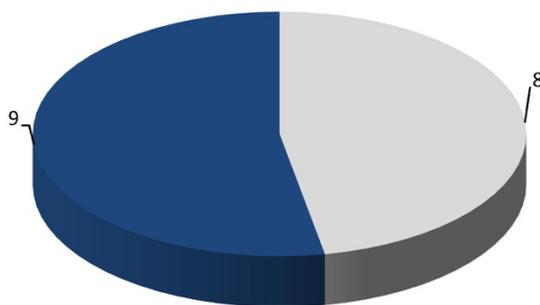
- Not applicable, as we were not contacted prior to the application.
- Yes, we value the opportunity to discuss project ideas already at an early stage.

Additional response option (not selected):
No, discussions about prospective projects have no benefit for us.



QUESTION 5, SERVICE PROVIDER

If applicants contacted you prior to their application, do you think it improved the quality of the applications?

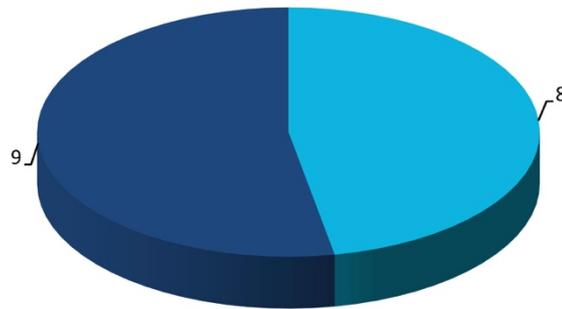


- Not applicable, as we were not contacted prior to the application.
 - Yes
- Additional response option (not selected): No



QUESTION 6, SERVICE PROVIDER

What do you think of the usefulness of a first central point of contact with respect to the following point: to guide the applicants in finding the appropriate RIs/service providers to support their projects?



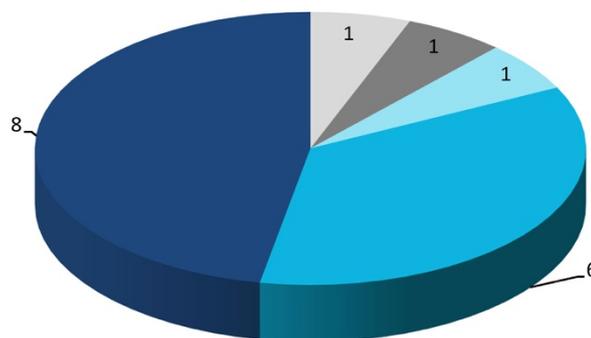
■ 4: good ■ 5: very good

Additional response option (not selected):
1: very poor, 2: poor, 3: average



QUESTION 7, SERVICE PROVIDER

What do you think of the usefulness of a first central point of contact with respect to the following point: to support the interconnection between the different RIs/service providers involved?



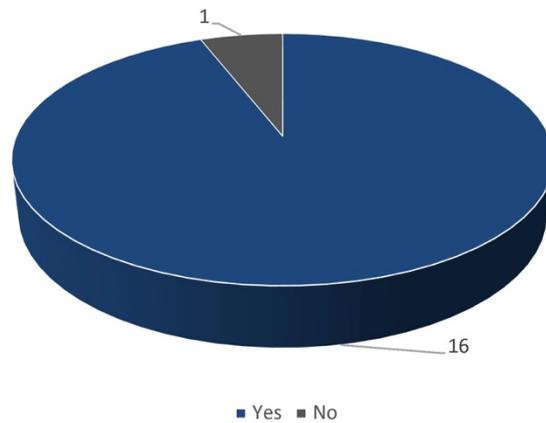
■ 0: not applicable ■ 2: poor ■ 3: average ■ 4: good ■ 5: very good

Additional response option (not selected):
1: very poor



QUESTION 8, SERVICE PROVIDER

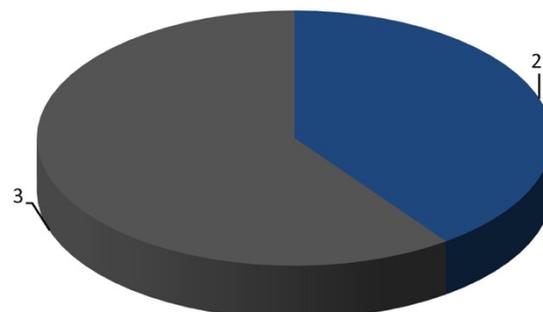
Would you recommend to maintain such a central contact for the sustainable provision of shared services across RIs?



QUESTION 9, SERVICE PROVIDER

What do you think of the grouping of services into Access Tracks?

NOTE: Chart is based on 5 answers only



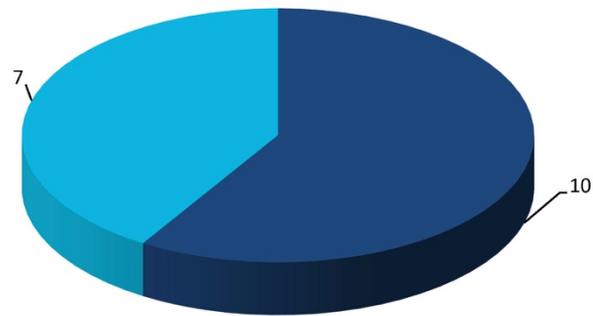
- The grouping of services helped to focus users' scientific target.
- The grouping of services narrowed users' options.

Additional response option (not selected):
The grouping of services was of no particular relevance to me.



QUESTION 10, SERVICE PROVIDER

With respect to the following point, were some of the proposals you received unexpected: individual service(s) requested from your RI?

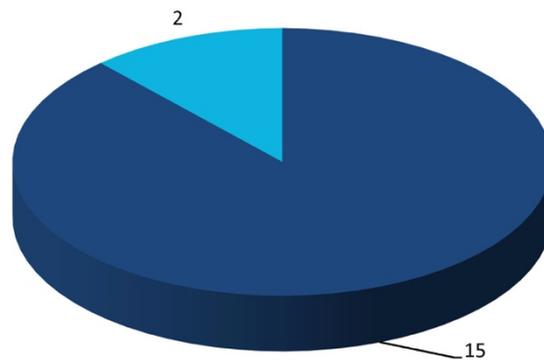


- No, the requested services were as usual.
- Yes, some of the requested services were quite unusual.



QUESTION 11, SERVICE PROVIDER

With respect to the following point, were some of the proposals you received unexpected: chosen combination of RIs and services providers?

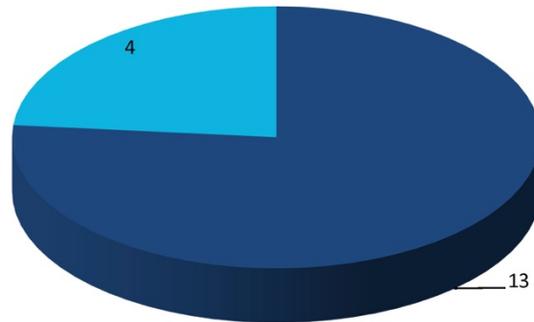


- No, the combinations were logical.
- Yes, the combinations were quite surprising.

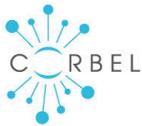


QUESTION 12, SERVICE PROVIDER

With respect to the following point, were some of the proposals you received unexpected: scientific rationale and field of projects requesting your support?



- No, scientific rationales and fields of projects were as usual.
- Yes, some of the scientific rationales and fields of projects were quite unusual.



QUESTION 13, SERVICE PROVIDER

Please comment:

would be great to set packages of services, a kind of pipeline (e.g. electron microscopy + modelling)

In general, maybe it would be good to have a mandatory TC during the technical review (not afterwards) to really define the status of the user projects and whether further adjustments should be made before applying.

Sometimes it seemed that a second infrastructure was only selected to qualify for a corbel project.

logical and good combination between RI needed by users.

Within some applications there were redundant providers in terms of requested services.

One of our projects was submitted first to a different RI of the same access track. This indicates that the user had not chosen the proper RI that would fit better their expectations. One of our projects was in a very immature stage. However, what they were specifically asking to us was OK, and with no reason to decline it. In one of our projects, we feel that our participation as RI can be made redundant by another RI.

Some of the proposals were excellent, well-thought-through proposals which, while challenging, have a reasonable chance of success. Other proposals were poor and it was clear that applicants either didn't have any real insights into what we could offer or what the limitations were. Such proposals tended also to be poor all-round.

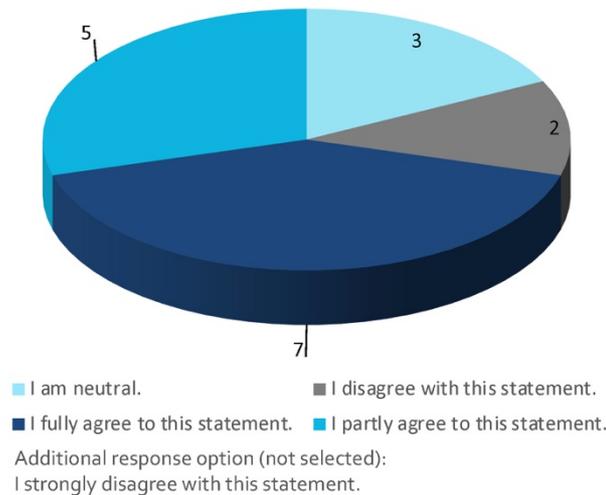
Proposals not fitting the service offered

In reviewing one application for Transcriptome analysis for Autism Spectral disorder, I had initially thought this "unusual" in the sense, that I hadn't been aware such methodology could be effective. The proposal prompted me to do some reading before finding out that there actually was a precedent for such work. Thus, the review made me aware of a broader range of applicability for the relevant work than I had previously appreciated.



QUESTION 14, SERVICE PROVIDER

The application we received matched the services we described in the Open Call.



QUESTION 15, SERVICE PROVIDER

Do you have suggestions to improve the alignment of service offers and user demands in the future?

Provide more example project descriptions on the website.

The user had sometimes unrealistic expectations regarding the capabilities of a method. They should be encouraged to contact us more. RI brand is important but more than logo, expertise is the most important for users. So better to highlight on the webpage the expertise than the RI name/acronyms.

As already suggested, a section collecting various example could be of help for the user

The applicants can be urged to contact the service providers before application. This will not only decrease the redundancy of requested services, but also help to avoid very immature projects which definitely needs a pilot study beforehand.

A more active participation of the RIs after the moment of submission would help in improving such alignment (see our answer to the first question)

Until the proposals were received it was not at all clear what level of resource would be required to support these projects. Clearly there is always the possibility of some variation but it will be interesting to see how things change in the next open call. Some applicants were unrealistic in their expectations of what we can provide. It took quite a lot of work in some cases to provide sufficient "evidence" of this incompatibility and quite a lot of email traffic (a) to understand what the applicant really wanted to do (because the proposal was not well-written) and (b) to explain the scope and limitations of what our resource is able to provide. There was the impression that we had to almost try and do the work in order to demonstrate the futility of such proposals, when it would have been much easier to give a straightforward response. It may also be useful if groups of service providers combined to provide the assessment. Whilst one part of a proposal might be feasible, if other parts are less so then this would render the project invalid.

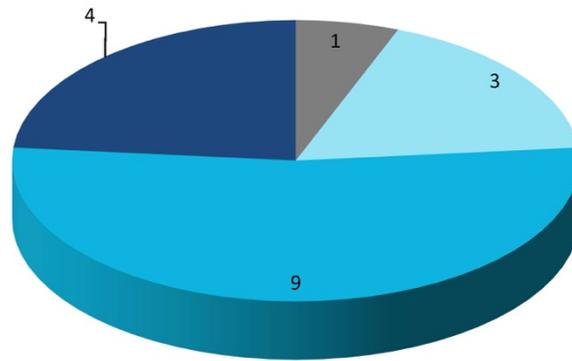
Maybe more contact directly with the services

I believe "alignment of services" might be facilitated by a more clear delineation of anticipated time-line of services between groups involved. For example, I'm ready at any point to do the analysis our group offered, but it remains unclear when I will receive such data.



QUESTION 16, SERVICE PROVIDER

How do you rate the proposal review process with respect to the step 'scientific review'?

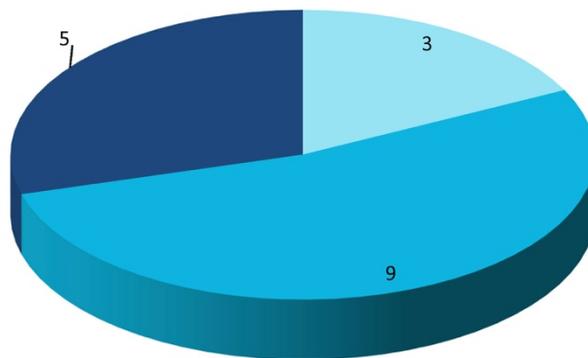


■ 2: poor ■ 3: average ■ 4: good ■ 5: very good
Additional response option (not selected):
1: very poor



QUESTION 17, SERVICE PROVIDER

How do you rate the proposal review process with respect to the step 'technical review'?



■ 3: average ■ 4: good ■ 5: very good
Additional response option (not selected):
1: very poor, 2: poor



QUESTION 18, SERVICE PROVIDER

If you have suggestions for improvement of the review process, please share them with us!

During the step of the technical review, there should be a possibility to rate the feasibility of the project in terms of a) general feasibility and b) whether the facility would actually be able to do it in time or has the capacities for. If the project is generally feasible, but the facilities has no capacities at that moment, the user could do the project later on.

It was difficult for us to review a large number of projects at the same time and having to wait in some projects for a long time on the scientific review. An evaluation process without application deadline would be appreciated.

Despite most of the users contacted us prior the submission, not all of them has done it. We suggest that all the applicants are requested to have preliminary contacts with all service providers. Alternatively, the RI staff could perform an analysis of only the technical requirements associated with the requested services prior to the scientific review. This could improve the quality of the proposals.

Reviewers can be informed about the services offered by providers.

First, the Aria system is not particularly intuitive and we found it difficult simply to know whether or not we had properly completed the necessary steps in reviewing a proposal. The process involves each resource commenting on their individual capabilities without seemingly a higher-level assessment of the scientific quality of the proposal being done first. This might be a better approach. In fact, it would be much better to combine the scientific and the technical reviews together - we for sure have a lot of scientific expertise which would be helpful to apply along with the technical viability.

to know better the support of each service



CORBEL shared services for life-science

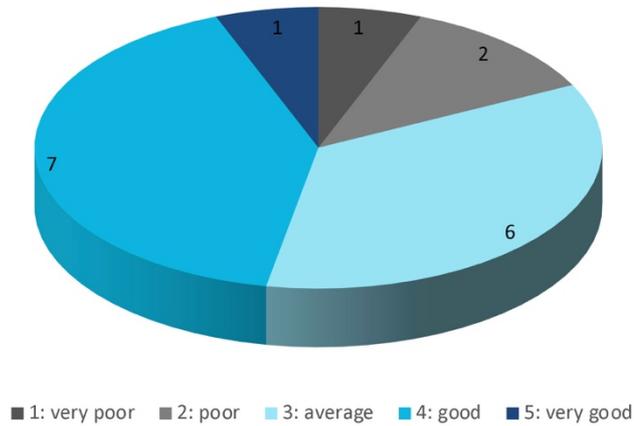
Section 2

ARIA as Application Management Tool



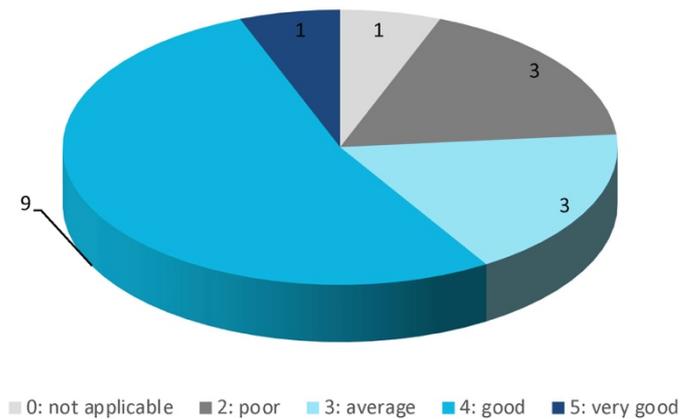
QUESTION 19, SERVICE PROVIDER

How do you rate the application management system Aria with respect to the following point: user friendliness?



QUESTION 20, SERVICE PROVIDER

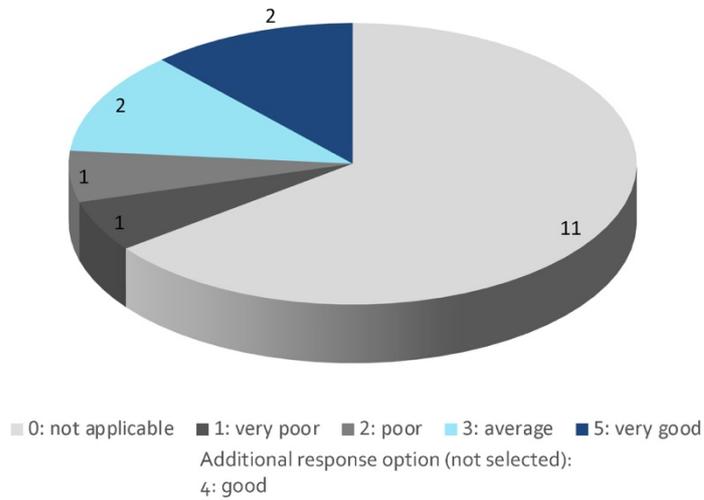
How do you rate the application management system Aria with respect to the following point: structure of the application process?





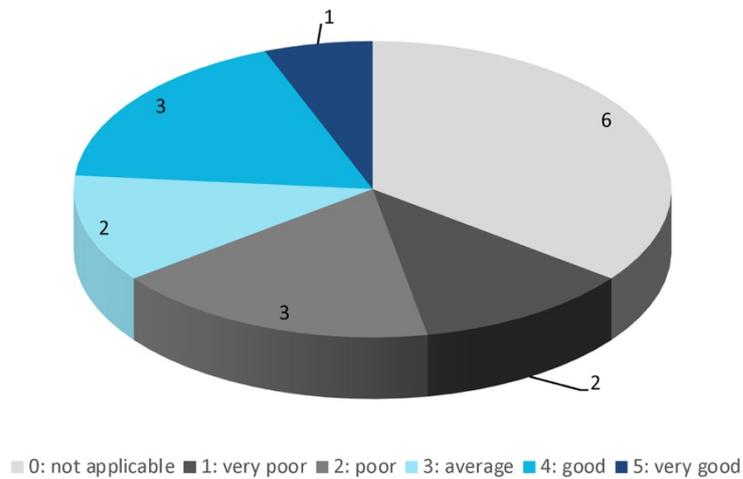
QUESTION 21, SERVICE PROVIDER

How do you rate the application management system Aria with respect to the following point: online support (if used)?



QUESTION 22, SERVICE PROVIDER

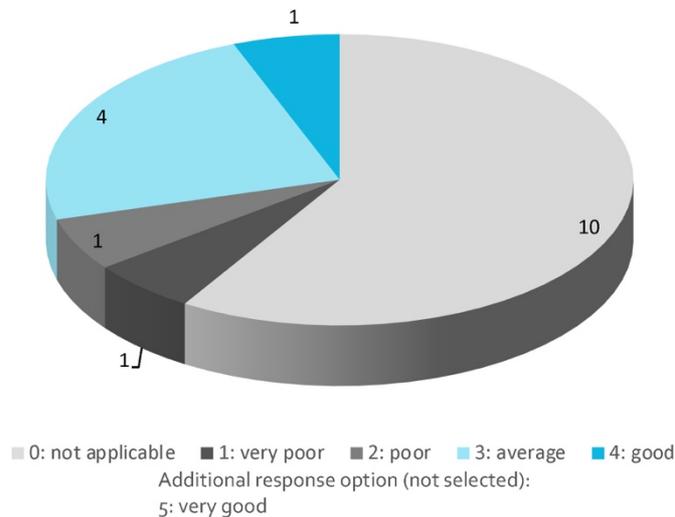
How do you rate the application management system Aria with respect to the following point: messaging system?





QUESTION 23, SERVICE PROVIDER

How do you rate the application management system Aria with respect to the following point: scheduling function?



QUESTION 24, SERVICE PROVIDER

Have you noticed any missing features? How could we improve Aria?

User friendliness: Honestly, I never got an introduction on how to use the system and intuitively, it's very hard to find the proposals/reviews in version 2.0 (intuitively easier in 1.0). That's also why we preferred to handle everything related to the project by email... For the messaging system: there should be a possibility to forward messages to the individual service provider email addresses (at least to one person in the specific RI). At the moment, one is not notified if there are new messages.

The login is not always working properly

We feel Aria is currently complicated, slow and not very intuitive. We got various feedback from applicants complaining it is not user friendly. Also this survey in aria was complicated, missed some answer-options and had too few free text fields for suggestions to improve. Next it crashed after all answers had been entered.

maybe some alerts on our pro e-mail box if there are some modifications on ARIA files related to our users (answer from the RI, comment from the users..) because we don't go checking often.

The ARIA 1 management system, was quite simple even though with space for improvement. We would await to have ARIA 2 fully functional to evaluate what is needed to be implemented

Most of the communication with our users and with other RIs has been performed outside Aria (by conventional e-mail and Skype

I left this same questionnaire in the evening and came back to it the following morning. I think my session had ended, but the application let me continue with filling in the survey and even produced some validation errors, while apparently "Submit Response" did not save my answers.

unfortunately Aria is not intuitive, is difficult or impossible to navigate, does not contain all the necessary information that is required (indeed, some information "disappears" after certain steps in the process have been completed) and has no (obvious) tracking capability. It would be great to be able to see all projects, their proposals, progress, timescales etc. But I can only find a list of project IDs and countries of origin. I'm afraid that doesn't help me to do anything...

trying to do more easily to use

Generally, I believe my other comments suffice for this, and I'm happy with the service. Perhaps for surveys such as this I would recommend a "save" option, so that if a connection is lost at the point of submission, the whole survey doesn't need to be filled in again from scratch.

Appendix 3: Survey Results - User



Survey Results – User

Part I



BACKGROUND

At the end of 2016, CORBEL organized the 1st Open Call for Research Projects. It generated a lot of interest among European scientists and attracted over 30 project applications. Among all eligible projects, 21 were finally accepted as CORBEL user projects, following careful scientific and technical evaluation.

Users had the opportunity to get open access to a wide array of technologies and services from the fields of biological and medical sciences. They had to request access to at least two BMS RI to be eligible.

As the 1st Open Call was very positively received by the user community, it was decided to launch a 2nd Call. Striving for continuous improvement, we wanted to learn from our experience with the 1st Open Call and to implement changes wherever desirable and necessary. The following survey addresses two main aspects, namely the application process and the use of ARIA as application management tool. Additional surveys will be run to also gain a better understanding of the success of individual projects, how to further improve trans-RI service provision, and on the overall impact of the CORBEL project.

The survey was answered by 18 out of 21 CORBEL users. For technical issues, Question 16 could only be answered by 17 instead of 18 users. Answers are shown as pie-chart diagram to illustrate the relative distribution of responses. In some cases, multiple selection was possible as indicated in the respective question. Some responses consisted of free text field. For simplicity, some responses were shortened, rephrased or deleted in case of multiple similar answers.



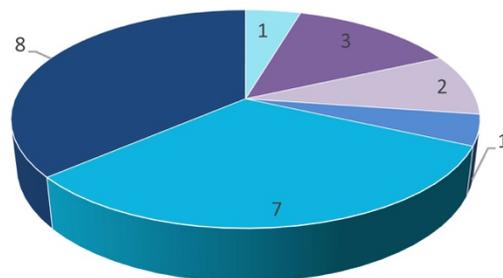
Section 1

Application Process



QUESTION 1, USER

How did you hear about the 1st CORBEL Open Call? Multiple selection possible.



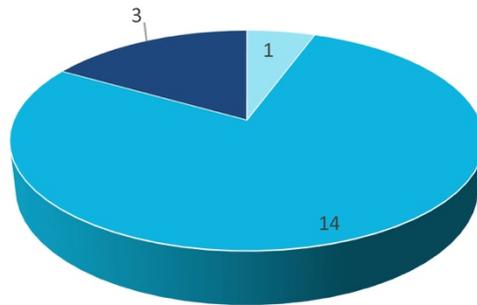
- Announcement at conference
- Direct mailing from infrastructure
- Direct mailing from other sources
- Other
- Personal contact
- Research Infrastructure website

Additional response option (not selected):
 Announcement in journal
 Social Media (LinkedIn, Research Gate, Twitter)



QUESTION 2, USER

How do you rate the information provided on the CORBEL Open call webpages with respect to the following point: instructions given



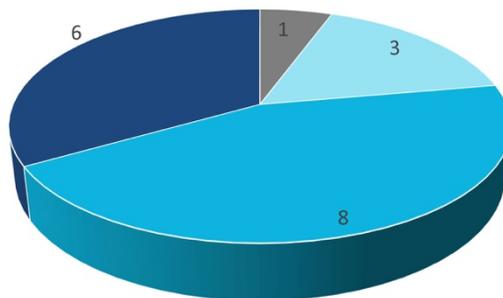
■ 3: average ■ 4: good ■ 5: very good

Additional response option (not selected):
1: very poor, 2: poor



QUESTION 3, USER

How do you rate the information provided on the CORBEL Open call webpages with respect to the following point: ease of use



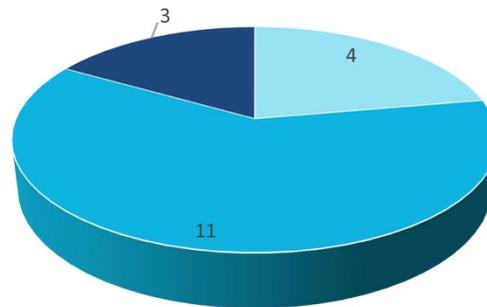
■ 2: poor ■ 3: average ■ 4: good ■ 5: very good

Additional response option (not selected):
1: very poor



QUESTION 4, USER

How do you rate the information provided on the CORBEL Open call webpages with respect to the following point: level of detail



■ 3: average ■ 4: good ■ 5: very good

Additional response option (not selected):
1: very poor, 2: poor



QUESTION 5, USER

Please comment in general on the content of the CORBEL Open Call webpages. Let us know how we can improve!

To improve the webpages, you can highlight that the applicant must contact the service provider before the submission

Description of the research infrastructure and contact persons

According to my experience, in general both the applicant and the service providers do not know which is covered by the grant

The content of Corbel Open Call webpages is well organized and easy to use.

The CORBEL web page looks quite fine to me.

The amount of information on the homepage is quite large and confusing for the first-time user. The graphic has rather little contrast and is hard to see. Many links from the homepage are incomplete, general or under construction. For example, the information content of Access, Data, ELSI is rather low. An exception is Innovation in which you can even find templates for NDA and MTA (without, however, to be expected here).

For the goal-oriented user, who is specifically looking for a laboratory providing a specific technique for a particular scientific question, the multitude of sub-links is initially confusing and it takes some time to orientate oneself. The best and fastest way to get there is to choose the 1st open call and click on Technologies and Services. Since finding labs with expertise in a special field is one of the main interest of users it should be prominently placed and the provided services should be described in detail (as done by ALMF, the CMC and SLN@BCN.

more detail and introduction would be helpful

The information provided is good. But I miss a clear statement about the maximum or the expected duration of the projects, or for how long the users are allowed to use the infrastructures. This is an important point to consider in the scheduling. Sometimes the projects are complex and finding the optimal conditions and setting up the protocols take a while.

The information provided by the CORBEL Open Call webpages was very useful.

Very clear really - would not add much. I could find what I needed in not so many words.

For me it is perfect. Thanks

It was not Always clear how to navigate to the different infrastructures.

Matching of two service providers was very difficult for us.

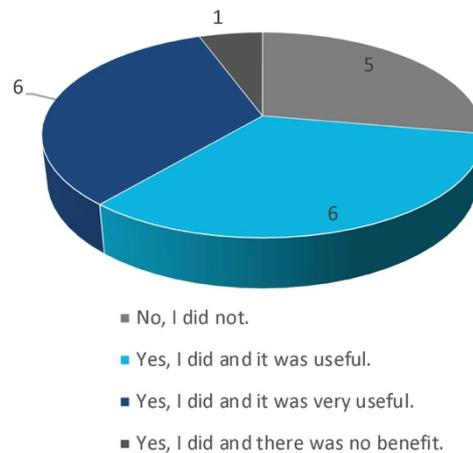
It was sufficient to achieve a comprehensive application. Navigating through the web side providers is not very easy.

All needed information is there. The only thing I would improve is the information about the possibility of requesting funding for materials and reagents.



QUESTION 6, USER

Did you contact the project managers ahead of the application submission and if so, was this helpful for you?



QUESTION 7, USER

Please comment your choice:

I contacted more times the manager to ask informations and to have their support and I always received an answer in brief time and with a solution to my question. I didn't contact the service provider before acceptance but I met by skype the service provider when the proposal has been accepted. I think that this point is essential for the quality of application

Yes it was helpful to contact the project manager and to know more clearly about the infrastructures available.

The project managers were amazingly helpful.

It is very important to talk with the infrastructure providers beforehand since otherwise it is difficult to write a feasible project. I think this is crucial.

It was useful discuss with the project managers in order to define a detailed program of experiments and visits.

Since we received information about the Corbel Call rather late, there was not much time left for a direct contact before the deadline. Therefore, the selection was made exclusively through the methods and technologies offered

I admit that I did not contact the project managers ahead. But later, I realized that it would have been very convenient to contact them to check the feasibility of the application and to discuss some aspects of the project. One of the reviewers raised some doubts in the review process, which led to some concerns for the project managers. These concerns were solved fairly quick. If I contacted the managers to discuss about the application before the submission, I think everything should have been much clearer from the very beginning. Fortunately, the project was accepted and is progressing well. I will take all this in mind for future applications.

I did not contact the project managers ahead of the application submission due to time constraints (deadline was very close). However, during the application procedure some technical issues arose and I contacted them through the website. I am very grateful to their prompt reply and professionalism so the issues were solved in due time. Thank you again to all of you!

It was not necessary.

I contacted the project manager for questions about the Corbel travel grant and I received all required information and support.

Both managers were very accessible and helpful in the application procedure

We asked about eligibility criteria and nature of funding which was not clear to us.

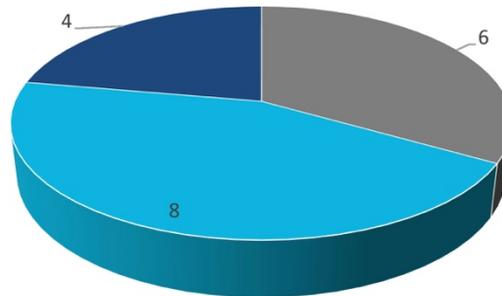
No time I realized the call too late

The contact person redirected the question and the answers I got were not very specific and useful. However this was only with one of the service providers. The other was very specific and initiated contact to know about the project.



QUESTION 8, USER

You were invited to get in contact with your preferred service providers ahead of your application submission. Did you make use of this offer and do you think it affected the quality of your application?



■ No, I did not. ■ Yes, I did and it helped.

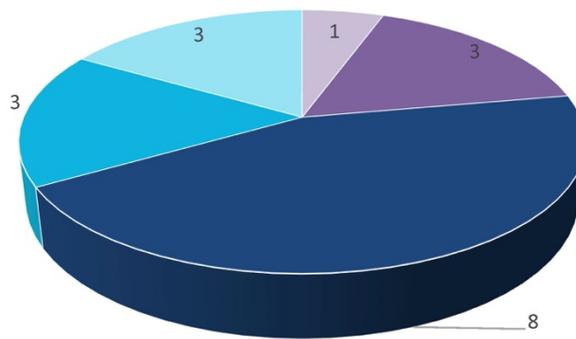
■ Yes, I did and it really helped.

Additional response option (not selected):
Yes, I did and it had no effect.



QUESTION 9, USER

How long did it take you to find all information you needed to prepare your application?

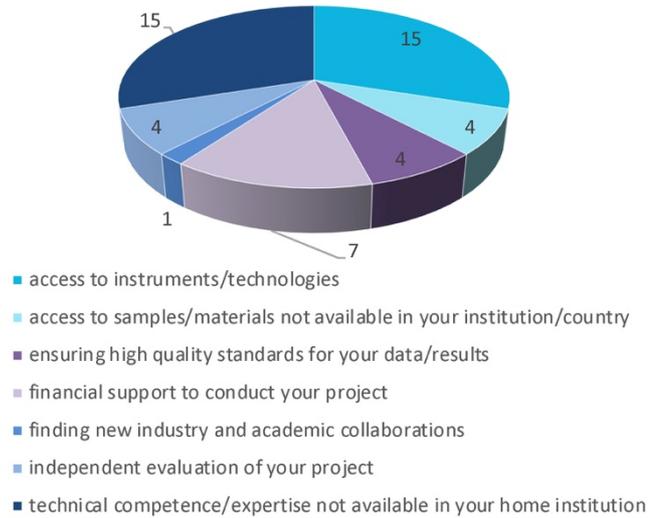


■ <1 hour ■ >8 hours ■ 2 - 4 hours ■ 4 - 6 hours ■ 6 - 8 hours



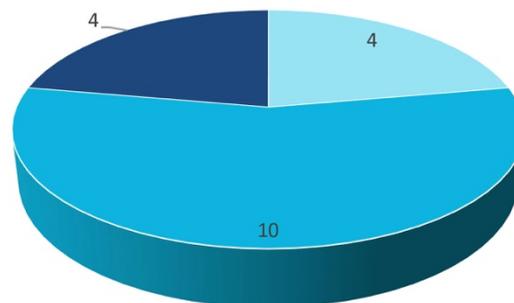
QUESTION 10, USER

What were your reasons for applying to CORBEL? Selection of multiple answers is allowed.



QUESTION 11, USER

The Open Call gave you the opportunity to apply to multiple RIs at once. How useful do you rate finding the key information about all RIs in one place?



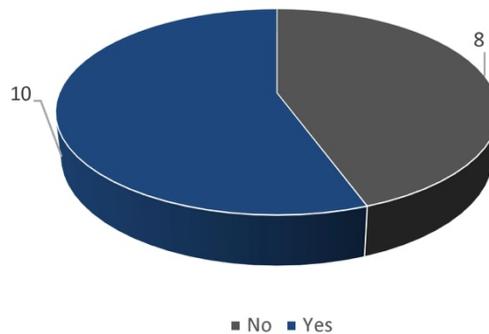
■ 3: average ■ 4: good ■ 5: very good

Additional response option (not selected):
1: very poor, 2: poor



QUESTION 12, USER

Do you prefer a single application over multiple separate applications?



QUESTION 13, USER

Please explain your choice above:

Yes, this is useful to have only one application for using several and complementary core facilities.

A single application streamlines the process, but also required me to think more deeply about how all parts plugged together.

it would be more reasonable to prepare and get a good evaluation of your project with all parts and steps included rather than applying for different grants with parts of the same project scattered

I would allow researchers to choose between a single application over multiple, because it may depend by the research project.

A central contact point independent of the host laboratory has advantages and disadvantages. We think a central project management is necessary to take care of all formal technical and organisational issues. At the same time, however, this also means bureaucratic expenditure of time, which is lost for the scientific-creative work. In a bilateral scientific cooperation, the partners have a common interest in solving a problem and communicate directly without bureaucratic friction losses.

It is expected that the project is planned and scheduled from the beginning, at least roughly, including the infrastructures that might be needed. Thus, it seems to make sense to apply for multiple RIs at once. However, having said that, it often happens that during the development of a project, new specific needs arise that may require access to a infrastructure. So, I feel it would be useful that the Corbel applications be flexible, allowing the users to apply for RIs by multiple or single applications. In addition, some technologies offered by Corbel might not be available through other European infrastructures (to our knowledge, FIB-SEM microscopy is not offered, at least clearly).

Therefore, Corbel may give an excellent opportunity to access those infrastructures by application to a single RI. This option is not available at the moment in Corbel, to my knowledge.

A single application facilitates coordination and better overview on the overall proposal.

A single application enforces some forward thinking and integration. That mitigates risks sometime connected to limited competence in one area.

In my opinion it is useful to have one single application with the opportunity to choose for multiple RIs. I only suggest that this should be an opportunity and not mandatory.

With separate applications one could do sequential steps, the requirement to apply to multiple seems somewhat artificial.

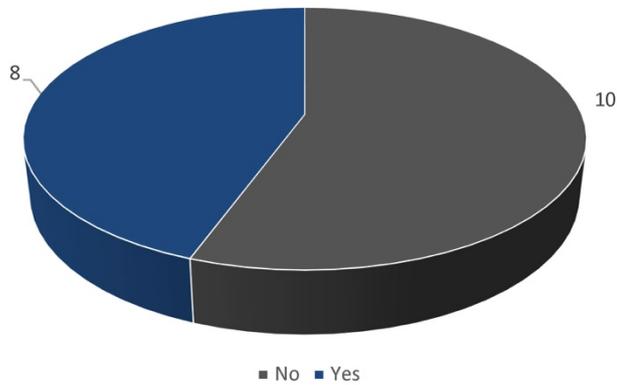
I personally think that it is reasonable to apply to multiple infrastructures to achieve the goal of the project

It enables a global view of the project and makes the process faster and simpler.



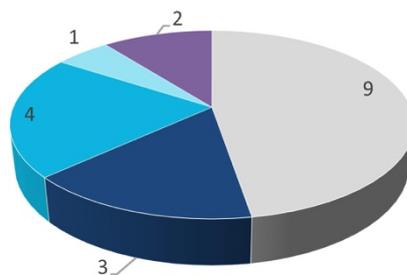
QUESTION 14, USER

Did you have prior knowledge of European research infrastructures?



QUESTION 15, USER

If yes, did your prior knowledge make any difference in your choice of service/technology?
(multiple selections possible)



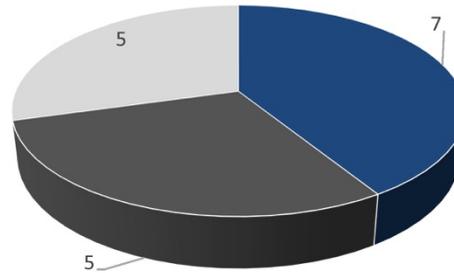
- Not applicable.
- Yes, knowing RIs helped me to identify the most suitable technologies and services.
- Yes, knowing RIs helped me to select the appropriate service providers.
- Yes, knowing RIs helped me to trust in the quality of their service.
- Yes, knowing RIs motivated me to request services from additional RIs for my CORBEL project.



QUESTION 16, USER

In the Open Call the available services were grouped into four different Access Tracks. Did this grouping into Access Tracks help you focus your scientific target or did it narrow your options?

NOTE: Chart is based on 17 answers only

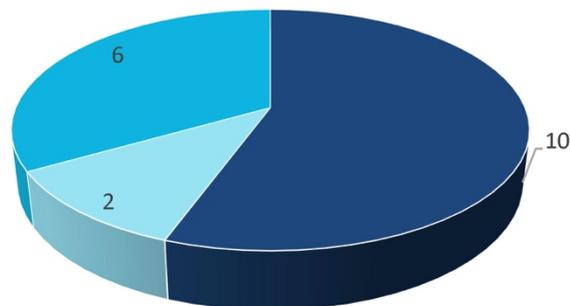


- The grouping of services helped to define my scientific target.
- The grouping of services narrowed my options.
- The grouping of services was of no particular relevance to me.



QUESTION 17, USER

The Open call offered both physical visits as well as remote access to RIs. How relevant are physical visits for you?



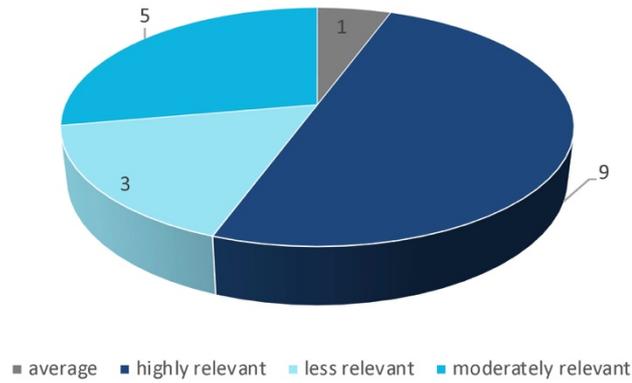
- highly relevant
- less relevant
- moderately relevant

Additional response option (not selected):
Average
Not relevant at all



QUESTION 18, USER

The Open call offered two types of access: physical visits as well as remote access to RIs. How relevant are remote services for you?

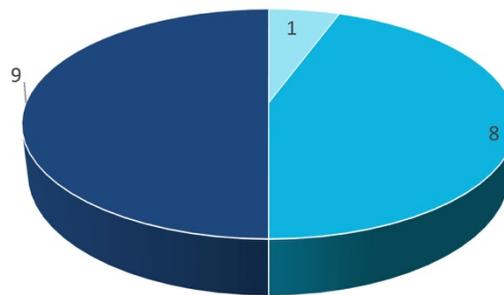


Additional response option (not selected):
Not relevant at all



QUESTION 19, USER

What do you think of the time it took to review your proposal?



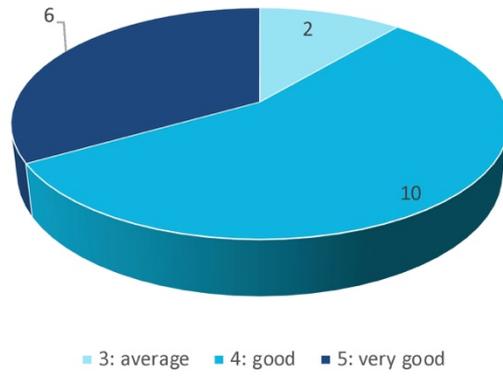
3: average 4: good 5: very good

Additional response option (not selected):
1: very poor, 2: poor



QUESTION 20, USER

How do you rate the proposal review process?

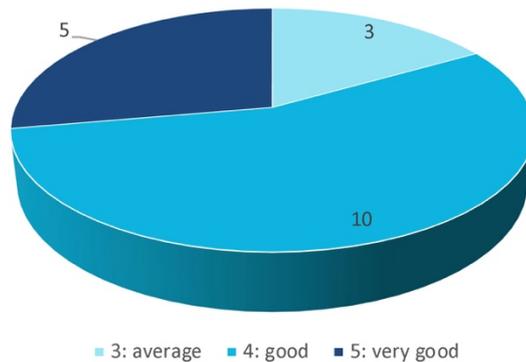


Additional response option (not selected):
1: very poor, 2: poor



QUESTION 21, USER

How do you rate the quality of the feedback you received?



Additional response option (not selected):
1: very poor, 2: poor



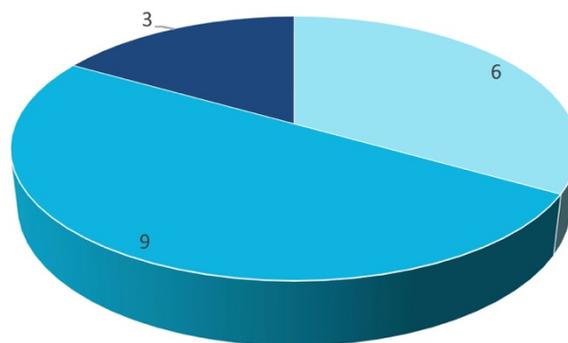
Section 2

ARIA as Application Management Tool



QUESTION 22, USER

How do you rate the application management system Aria with respect to the following point: user friendliness?



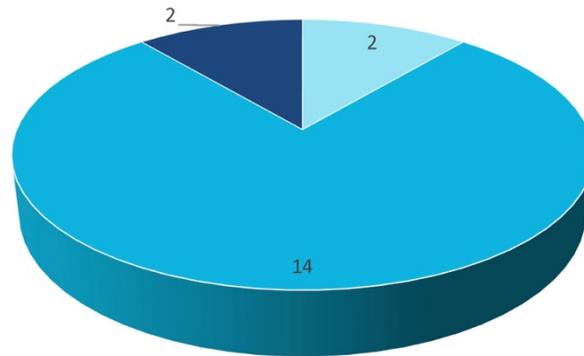
■ 3: average ■ 4: good ■ 5: very good

Additional response option (not selected):
1: very poor, 2: poor



QUESTION 23, USER

How do you rate the application management system Aria with respect to the following point: structure of the application process?



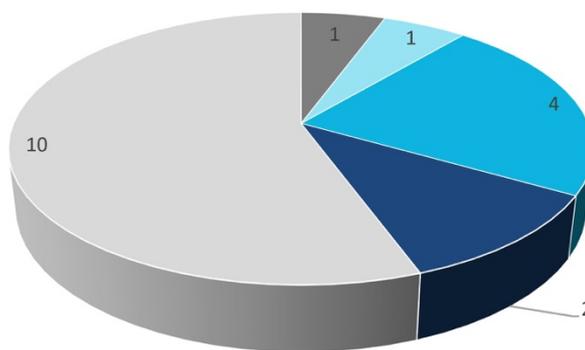
■ 3: average ■ 4: good ■ 5: very good

Additional response option (not selected):
1: very poor, 2: poor



QUESTION 24, USER

How do you rate the application management system Aria with respect to the following point: online support (if used)?



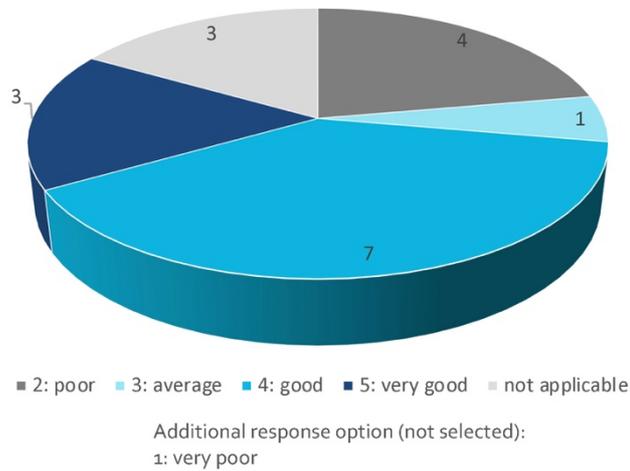
■ 2: poor ■ 3: average ■ 4: good ■ 5: very good ■ not applicable

Additional response option (not selected):
1: very poor



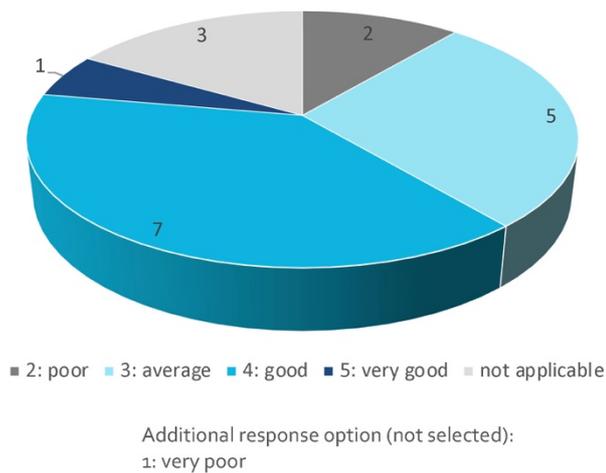
QUESTION 25, USER

How do you rate the application management system Aria with respect to the following point: messaging system?



QUESTION 26, USER

How do you rate the application management system Aria with respect to the following point: scheduling function?





QUESTION 27, USER

Have you noticed any missing features? How could we improve ARIA?

The access to the dashboard has been down for a very long time. I think this is not a good way of communicating with the infrastructures. Email is more efficient since you know that you've received a reply in real time. On the other hand it is hard to have records of the communication by email so I guess an online platform with messages with link to email would be perfect.

Did not notice any particular missing feature

So far, everything worked fine.

Just a comment: ARIA provides good tools to communicate with RIs. But in our experience, personal email communication between the researchers and the expert at the RI who will carry out or assist us in the experiments seems to be most direct communicating mechanism.

The whole experience was excellent. I am grateful to all of you I had the opportunity to interact to date. Thank you!

As I am related to the ARIA development team (iNEXT) I am not a good person to rate my ARIA answers; I admit bias.

No thanks, it is fine like it is

A note to Corbel, rather than Aria. It would be nice to get a cost estimate for institute administration, but I see the potential difficulty.