

Summary report: ESFRI Workshop on the Future of Research Infrastructures in the European Research Area

6-8 November 2019, Los Cancajos, La Palma, Canary Islands

[Session 3. Fostering Effective Open Access to Research Infrastructures](#)

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Session Objectives

(As formulated in the program)

One of the key elements in fostering scientific excellence in Europe is ensuring that researchers, wherever they are, have the possibility to access facilities, resources and services of the first-class European Research Infrastructures, suitable to their needs. This session discussed the current access practices, funding models, challenges and bottlenecks across the different scientific domains and explored effective ways to make further progress in this area. Reflecting on the [European Charter for Access to Research Infrastructures](#) and possible improvements to this document were part of the discussion.

Session Presentations Program

- [Introduction](#), Yannis Ioannidis, ESFRI Vice Chair, Chair of ESFRI Task Force on TNA
([download the presentation](#))
- [Access to Research Infrastructures: Finances](#), Jose Luis Martinez, Chair of ESFRI SWG on Physical Sciences and Engineering ([download the presentation](#))
- [Access to Research Infrastructures: Services](#), Martin Van Breukelen, Executive Manager, European Magnetic Field Laboratory ([download the presentation](#))
- [Access to Research Infrastructures: Operations](#), Christine Kubiak, Operations Director, ECRIN
ERIC (*cancelled*)

Round-tables introduction

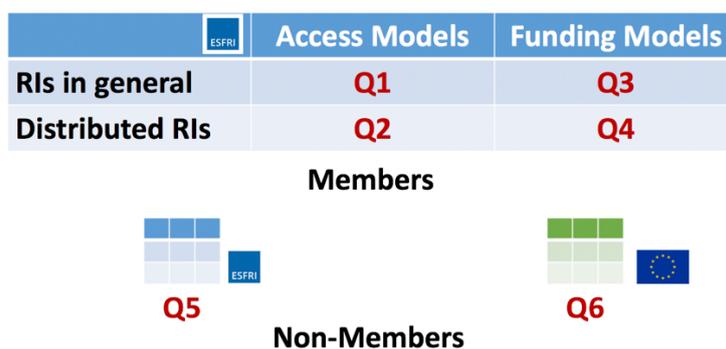
A long-time objective of Europe has been to increase and open up trans-national access (TNA) to national research infrastructures (of European interest) and to European research infrastructures, such as those prioritised by ESFRI. Nevertheless, this has not been as successful as originally envisioned. Some of the possible reasons may be related to lack of availability, e.g., when competing with national users, or finances, e.g., when no specific funding of [additional] costs by home or host organizations are available. In addition, issues related to personal data, security or intellectual property often become more sensitive in a trans-national context and close up access. Of course, the bottlenecks may actually be very different depending on the scientific domain, the modality of access for a class of infrastructures, or the nature of costs and funding model.

A key motivation for this session was to look into the reasons why access to research infrastructures has not been as open as one would like, especially trans-national access, and suggest solutions and/or corrective actions. During

the session, the workshop participants actively engaged in very intense discussions on all the main aspects of the issues concerned, offering deep insights and novel ideas on how to move forward productively.

Round-table discussion focus

As with all sessions, the participants were grouped in ten tables of eight to ten persons per table. During the session, six questions were raised and discussed, with each table focusing on two of these questions (with one or two additional questions, in case of time availability). The questions were partitioned in three pairs: The first pair dealt with transnational access models/policies for members of ESFRI RIs, one question for RIs in general and one for distributed RIs. The second pair was symmetric to the first but dealt with funding models of transnational access. Finally, the third pair dealt with transnational access of non-members of ESFRI RIs; the first question inquired about the landscape of related models and policies, while the second pondered the development of a special European-level program for (non-member) transnational access to ESFRI RIs. The overall structure of the six questions is given schematically below.



The key messages from the tables for each question are given below, while a more detailed account of the discussions is given in the last section of this document (Appendix).

1. **What are the current (transnational) access models/policies used for members of ESFRI RIs? What are their key weaknesses with respect to ensuring effective access? Are there any differences across RIs in different scientific domains?**

Several issues around access models appear to be universal across all types of research infrastructures. The most critical one is that all access models to publicly funded RIs should be offering predominantly excellence-driven & free access to the facilities. Beyond that, there are several variations in RI access models depending on whether they are for a physical RI (where access should be based on merit) or for a data and software RI (where access should be open and free to everyone). In several access models, especially for physical RIs, members are being privileged and have more services at their disposal than non-members. Examples of the full spectrum of services that may be included as part of accessing an RI, beyond the time on the RI instruments, include technological and other support to prepare experiments, RI-specific datasets for best validation of results, and of course providing accommodation next to the RI. Still, the key challenge for all types of RIs is not access but funding.

2. **Are there any specific transnational member access models/policies for distributed ESFRI RIs or any specific challenges they face in offering such access?**

It is quite difficult to clearly separate centralized from distributed RIs when it comes to several aspects of access models. In fact, there appears to be a spectrum of RIs between the two ends with a variety of approaches to access models. Still, access models for centralized and distributed RIs are not very different, except for the heterogeneity in national access policies and corresponding legal frameworks, which must be resolved from the very beginning of establishing an RI. The key difference in access models is that between physical access and data access.

3. **What are the main funding models used for ESFRI RI member access and what are their key weaknesses? Are there any differences across RIs in different scientific domains?**

Current funding models for RIs fail to cover all possibilities and this creates several gaps in the community's understanding of them. There is a great variety of funding models in individual RIs, according to several dimensions that characterize them, in particular, their nature (e.g., physical or data, centralized or distributed), their access criteria (e.g., excellence-driven or market-driven), their users status (e.g., full member, associate member, academic non-member, or industry), and their governance schemes (e.g., ERIC or EIROForum). There is extensive experience with which should serve as the starting point for unifying and rationalizing the overall space of funding models. Furthermore, the benefits of particular funding models should be articulated and disseminated broadly, to help increase the overall understanding of the models that exist in the stakeholders, for them to be making informed decisions. For example, it is not always clear to everyone that membership in an RI has the member-exclusive benefit of receiving funds from EC projects, which often exceed the membership fee.

4. Are there any specific funding models for member access to distributed ESFRI RIs and what are their key weaknesses?

As with access models, there does not seem to exist any major funding model particularities that are due to a research infrastructure comprising several distributed research facilities. The key difference is between funding models for physical infrastructures and funding models for data infrastructures.

5. What are the current (transnational) access models/policies and corresponding funding models used for non-members of ESFRI RIs, in general, and of distributed RIs, in particular? What are their key weaknesses with respect to ensuring effective access? Are there any differences across RIs in different scientific domains?

It is often the case that access and funding models for non-members of an RI are not articulated separately but are embedded into more general models that offer cohesive schemes for all types of users. Such comprehensive models are able to handle cases of member/non-member collaborations, which are quite common in research. What is very noteworthy, however, is that there is disagreement in the community (or at least among the participants of this workshop) on the need to distinguish between members and non-members in access and funding privileges, with one opinion advocating for always maintaining a clear distinction between the two user categories, for fairness, with another advocating that access should be excellence-based for all, with no difference between members and non-members.

6. Each ESFRI RI has a different country geometry, inevitably, scientists from several countries do not have member access privileges. Should a pan-European RI access "market" be developed (in the context of a renewed ERA), with access policies and funding models complementary to those of individual ESFRI RIs?

Establishing a scheme of pan-European nature for funding transnational access is a pivotal issue. There seems to be a universal sentiment that TNA is suffering and that some funding instruments at the EC level is necessary for truly boosting such activities, which are fundamental to European researchers and the health of the ERA. There is also general agreement on the inappropriateness of the "market" concept and term to describe any reciprocity-based RI service offerings across national borders, with more fitting alternatives being suggested in the spirit of "exchanges".

Draft Recommendations

Based on the key messages that came out of the extensive discussions and the critical details that have come on the various issues, one may draw some initial, broad recommendations on what may be the way forward with respect to access and funding models for research infrastructures. These are given below and should serve as input to further elaborations and discussion and more comprehensive studies before arriving at any major conclusions to be acted upon.

1. Access to physical RIs should continue to be excellence-based, with the quality of the work being determined following a process of peer review of proposals submitted by the community.
2. Access to data RIs should be open and free at the point of use.
3. A concerted communication and impact assessment effort should be launched by the RI community to inform all researchers about the value of RI access and all other RI services. This should include training through material production, conferences, and other means.

4. An attempt should be made to harmonize national policies and legal frameworks on RI access and funding models, as this will have a tremendous beneficial impact on reducing the overhead of establishing and operating (especially distributed) RIs as well as on transnational access afterwards.
5. The cost of (transnational) access should stop being funded mostly through projects but should become part of the RI operation budget. For this to be realized, cost models for the entire operation of RIs should be available so that the full cost of RI access may be calculated.
6. Covering RI access costs should become eligible for an expanded set of funding sources, including national funds, European structural and investment funds, and appropriate EC framework funds (e.g., all Pillar 1 and Pillar 2 instruments in Horizon Europe).
7. National rules may pose limitations to funding access of infrastructures abroad. Horizon Europe and other EC-level programs should provide funding for transnational access.

Detailed discussion points

Despite the rather firm structure of the set of questions and the concrete logic of assignment of questions with a particular theme to each table, discussions naturally drifted away and spilled over to some of the questions beyond each table's specific assignment or even touched upon issues much broader. As much as possible, the account below ignores the table where each point came from and the question in the context of which the point was made but groups the main points of the discussions according to their relevance to the particular questions.

Before proceeding to the individual questions, one general observation from across all discussions is that there is still some confusion between the concept of open access and the concept of free access. Especially for accessing data infrastructures, the important concept of FAIR data does imply open access but not necessarily free access. In general, open access guarantees that access is free at the point of use (with the underlying costs of offering such access being covered by sources other than the users), and it is with this interpretation that the two terms are used interchangeably below.

Q1: What are the current (transnational) access models/policies used for members of ESFRI RIs? What are their key weaknesses with respect to ensuring effective access? Are there any differences across RIs in different scientific domains?

Access to RIs is mostly associated with user time on the RI instruments (for physical RIs), but this is a rather inaccurate and limiting point of view. A broader and more accurate conception of access includes many more services, such as offering the necessary technological and other support to prepare experiments, providing relevant accommodation, or releasing RI-specific datasets for best validation of results.

The table discussions on access models for ESFRI RI members brought up several issues that appeared to be universal and in the minds of everyone. In addition, there were also specific aspects on which insightful comments were made individually. Below are the main messages drawn from all the discussions, followed by more detailed issues raised for each of the three parts of Q1.

- **Key messages**

- The foundation/starting point of all access models to publicly funded RIs should be offering predominantly excellence-driven & free access to the facilities, with RI members being privileged and having more services at their disposal.
- RI access models vary depending on whether they are for a physical RI (where access should be based on merit) or for a data and software RI (where access should be open and free to everyone).
- The key challenge is funding, which is directly linked to monitoring and impact assessment of RIs and is equally challenging for both centralized and distributed RIs.

- **Detailed issues and suggestions**

What are the current (transnational) access models/policies used for members of ESFRI RIs?

- As a universal principle on access policies, physical access has always been and should continue to be based on peer review, with the main criterion being the quality of the work proposed in response to calls that are open either only to members or to the entire community.
- Due to their limited resources, it is typical for physical RIs to adopt models that partition access time into three components: standard access to members according to their proportion on some key parameter, e.g., financial contribution; competitive access to members based on excellence; and possibly a (usually small) fraction of competitive access open to non-members and/or fee-based access to the market. There is a natural competition/tension between the three components, members vs non-members, scientific excellence vs quotas/geographical return, so identifying the right proportion according to the priorities of an RI is a significant challenge.
- An interesting observation that may be affecting policies is that there is a trend to move from physical access to remote access even for RIs that are physical facilities.

What are their key weaknesses with respect to ensuring effective access?

- There was a widespread conviction that the key obstacle in effective use of RIs is not related to issues with access or access policies per se; it is funding (addressed in Q3 and Q4). Still, some additional issues come into play and have a negative effect as outlined below
- A key weakness is related to the value that RIs bring to the scientific endeavor and is two-fold.
 - There is lack of awareness among many researchers and funders of the role RIs can play in enhancing and strengthening a research project, or in some cases making it even possible. This is rather widespread and cuts across researchers in most scientific fields as well many national and international funding agencies, including the EU (beyond the units focusing on RIs proper). A common related side-effect is a typical lack of appreciation for Open Access and the valuable benefits it brings.
 - There is lack of appropriate accurate models to assess the real value that RIs bring and the impact their use may have to research breakthroughs. Moreover, even if such models exist, they all require to keep track of the steps that have led to a particular research outcome, including the possible use of particular RIs, a process that is rather cumbersome and not embedded well into the current research processes.

For both aspects, concerted communication and impact assessment efforts by the RI community itself is in order. It is important to communicate the value of RI access as well as all other services offered, including scientific expertise and training. There should be training for the research community at large through material production, conferences, and other means.

- For data and software infrastructures, user monitoring is particularly challenging and potentially requires a different approach for each individual RI. For instance, in ELIXIR or CLARIN, monitoring and measuring usage is inaccurate, as sometimes users find information through a commercial search engine and not the RI portal, without the RI being able to detect it is being used. For another instance, most Social Science and Humanities RIs, e.g., SHARE, must identify the affiliation of potential users before giving access, to protect the privacy of personal data they store, which should not become available to commercial entities or even policy makers (e.g., OECD, UN). In general, the more open the access model of an RI is, the more complex monitoring of its users becomes.
- There is a tradeoff between access opportunities and access model complexity. Collaboration among RIs having similar facilities, including facilities with different access models, and partnering with international facilities are both very desirable as they broaden access possibilities. Nevertheless, they also complicate and/or blur access strategies/models, as they need to become more intricate and heterogeneous, embed adaptive optimization of their calendar of operations, and take into account differences in, among other things, platform constraints, national requirements, and scientific methodologies. The right balance point in this tradeoff is often elusive, resulting in poorer levels of use, whether because of limited opportunities or because of access model complications that act as a deterrent.
- Free and open access is an advantage to non-members. However, being a member of an RI brings additional benefits on top of access itself, such as internationalization, increased participation in EC projects on RIs, and obtaining support from the main RI office to improve national facilities.
- An additional issue that hampers access to RIs that rely on facilities already existing for a long time is that, although a very important component of their services, access to their legacy data is hard due to the costly data cleaning, integration, and curation required beforehand.

Are there any differences across RIs in different scientific domains?

- The key differences in access models are not between scientific domains but between physical RIs and data and software RIs.
- There is some correlation between scientific domains and the nature of RIs, e.g., PSE has more physical centralized RIs, whereas H&F, ENV, and SCI RIs have more distributed and data RIs. Still, the key differences in access models do not come from the domains themselves but from the above aspects of the RI nature.

- Industry relations for RIs are domain specific with respect to both its nature and its level of maturity. As an example, health RIs are already advanced in offering appropriate services to companies. As a counterexample, environmental RIs, e.g., eLTER, have limited related history, are less experienced, and would need some help in defining how a collaboration with industry should be put in place.
- Besides differences between RIs that are due to differences in their domains, each individual RI may employ an access model that differs from others in some details. Below are examples provided for some RIs:
 - CLARIN (data): open access for all researchers from all countries that are members; people with a commercial purpose have some limitations.
 - SSH/SHARE (mostly data): open access, free of charge, with approval (username/password); no commercial access for privacy reasons, due to the presence of personal data.
 - ELIXIR (data): open access without approval (besides sensitive data).
 - EU OpenScreen (physical / data): open access, paid for physical (lower rate for locals), free for data; excellence-based for physical access.
 - eLTER (physical / data): limited access as RI is still in its starting prep phase; it has 200 hundred sites for physical access.
 - CERIC-ERIC (physical – “federation” of centralized RIs): open access based on merit after proposal evaluation; proprietary access to industry for a fee; global access, with promotion to potential users from countries with low usage (currently underrepresented communities); 10% of each instrument in a country guaranteed for scientists from other member countries.
 - MIRRI (physical): open access for members (10 members, 40 sites) with selection of projects based on excellence.
 - INSTRUMENT (physical): restricted transnational access; excellence-based access via proposal evaluation by expert committee; members get preferential treatment compared to non-members.

Q2: Are there any specific transnational member access models/policies for distributed ESFRI RIs or any specific challenges they face in offering such access?

Several insightful thoughts on access models for members of distributed ESFRI RIs were expressed during the table discussions. Interestingly, many particularities of distributed RIs came up in the context of discussions of other questions, primarily Q1, demonstrating the difficulty in clearly separating centralized from distributed RIs when it comes to several aspects of access models, and pointing more towards a spectrum between the two ends. Below are the main messages drawn from all the discussions, which corroborate very well with those of Q1, followed by more detailed issues raised for Q2.

• **Key messages**

- Access models for centralized and distributed RIs are not very different. The key difference that dwarfs all others is that between physical and virtual access.
- Different national policies and legal impediments must be taken into account in the preparatory phase of distributed ESFRI RIs.

• **Detailed issues and suggestions**

Are there any specific transnational member access models/policies for distributed ESFRI RIs?

- Access models for distributed RIs are even more diverse than those of centralized RIs, as there are several additional dimensions they have to take into account:
 - Identifying the fraction given to members across the different sites vs. that left up to the individual sites for their normal local use by home researchers and other users.

- Harmonizing different national access policies, already from the preparatory phase, and if needed, updating national policies to match the needs of transnational access.
- Incorporating the need of certain fields, e.g., environmental / ecosystem RIs, of offering access to multiple sites of a distributed RI at the same time.
- For a distributed RI that is essentially an integrator of national RIs, it should have a central model for excellence-based access by researchers, but it is better to leave the management of market-driven access at the national level.

Are there any specific challenges that distributed ESFRI RIs face in offering such access?

- Policies on open access to data and software without approval or with approval for sensitive data are much more complicated and intense in distributed RIs due to national regulation differences, e.g., with respect to restrictions on sharing patient data.
- Physical access to different sites of distributed RIs by researchers may be hindered by immigration/visa limitations, residence permits, and other national regulations; dealing with such obstacles may be increasing significantly the preparation time for a visit. ESFRI should collaborate with policy makers in MSs/ACs to come up with an appropriate legal and policy system for TNA.

Q3: What are the main funding models used for ESFRI RI member access and what are their key weaknesses? Are there any differences across RIs in different scientific domains?

Table responses for Q3 demonstrate that the space of funding models for RIs is not well defined and the need to have a better understanding of the possibilities and address the gaps that current models leave is very current. There is extensive experience from the RIs themselves that has led to many ideas on how this space may be extended and rationalized in the near future. Below are the key take-aways from the discussions and some further details that were addressed.

- **Key messages**

- Funding models vary quite significantly along several dimensions that characterize RIs, in particular, their nature (e.g., physical or data, centralized or distributed), their access criteria (e.g., excellence-driven or market-driven), their users status (e.g., full member, associate member, academic non-member, or industry), their governance schemes (e.g., ERIC or EIROForum), and (less so) their scientific fields.
- National rules may pose limitations to funding access of infrastructures abroad. Horizon Europe and other EC-level programs should provide funding for transnational access.
- Funding through membership fees may be a hard sell to member states, especially in conjunction with open access. Nevertheless, an important membership incentive is the opportunity to receive funds from EC projects, as participation in them is reserved exclusively for members. For example, ELIXIR has a high success rate in projects, thereby financial returns to its member countries usually exceeding investments.

- **Detailed issues and suggestions**

What are the main funding models used for ESFRI RI member access?

- Access is typically free of charge, whether it is excellence-based physical access for members or open data access for everyone. Especially for data RIs, this is also common for most services other than access as well, e.g., for several of the value-added services of ELIXIR, such as managing, linking, and understanding data. Covering the costs of such free access is a very big challenge, especially for data RIs.
- The possibility of paid access does exist in several RIs but is limited to certain types of users, e.g., for industry, and for physical RIs, its offering depends on the remaining capacity of the RI. More generally, where available, paid access is associated with increasing amounts from symbolically covering some marginal cost to covering the full cost, depending on the user status.

- For EIROForum RIs, the intergovernmental organizations have their own funding agreements, sometimes limiting access for non-members. ERICs are more flexible and open to outsiders, but they are not always able to fully cover their cost, as they receive no support from the EU for that.
- Physical transnational access is funded through projects (often travel grants).

What are the key weaknesses of the main funding models used for ESFRI RI member access?

- There is one major weakness with respect to current funding models of Transnational Access: they are all based on projects, whose processes and timing are independent of the RI operation itself and may be ad hoc. This puts access costs on the shoulders of researcher, thereby hampering access to RIs, and offers no long-term sustainability. Below are several thoughts on how to rectify the problem but also to improve upon other aspects, which may not be as critical as the one above.
- It is often the case that current funding models do not account for any long-term accumulation of funds to be used for large updates to the RIs at the appropriate time.

What are possible points of improvement of current funding models?

- The cost of (transnational) access should stop being funded mostly through projects but should become part of the RI operation budget. There should be a specific budget line for RI access in each country. Alternatively, each RI should have a central budget line for accessing it. This transition is a major challenge but is key for accountability.
- For the above to be realized, cost models for the entire operation of RIs should be available so that the full cost of RI access may be calculated.
- Covering RI access costs should become eligible for an expanded set of funding sources to stimulate access to RIs.
 - ESFRI RIs have insisted on the importance of the EC supporting TNA, e.g., in the form of including such costs in the budget of R&D projects (in analogy to similar national level processes, for example, in Germany).
 - By its nature, transnational access to RIs has several secondary beneficial effects, such as personnel mobility and training, technology gap filling, capacity building, and bridging gaps among members states. Therefore, travel to physical infrastructures and other TNA costs should become fundable in all relevant schemes and from any combination of national funds, European structural and investment funds, and EC framework funds.
 - The cost of RI access is already eligible for many EC instruments, e.g., MSCA, ERC, and other mobility schemes, and hopefully forthcoming programs, e.g., Pillar 2 missions of Horizon Europe, but the research community is making little use of these opportunities. They should be given more visibility so that the level of RI use increases.
 - For specific use cases, mostly as supplementary to some core resources, one may consider alternative funding models as well, such as those mandated by private foundations, e.g., Bill Gates Foundation or Wellcome Trust, or followed by Wikipedia. The overhead, however, is significant.
- RI budget management should have more flexibility, so that funding models may become most amenable to adaptation to the needs of the RI user communities and allow budget resolution to be done mostly in an a posteriori than an a priori fashion.

Are there any differences in funding models across RIs in different scientific domains?

- No significant funding model differences appear to exist that stem from the particular scientific domain of RIs.

Q4: Are there any specific funding models for member access to distributed ESFRI RIs and what are their key weaknesses?

Table discussions for Q4 were very lively and animated but revolved mostly on much more general issues of access and funding models than the particular focus of the question. The participants raised very few points that are specific to funding models for distributed research infrastructures, indicating the lack of any major funding particularities that are due to research facility distribution. These few issues are all outlined below.

- **Key messages**

- As with access models, so is with funding models, that centralized and distributed RIs are not very different. The key difference again is between physical and data infrastructure funding.

- **Detailed issues and suggestions**

Are there any specific funding models for member access to distributed ESFRI RIs?

- In distributed RIs in general, a large proportion of the cost generated by each individual facility is covered by the facility itself and is not embedded into that of the corresponding European RI. Funding of the over-arching RI operations is covered in several ways, e.g., CERIC-ERIC operations are fully funded by one of the member states (Italy).
- For distributed data RIs, the core data facilities and services are usually open to everyone and mostly free. In certain cases, e.g., in ICOS, additional services, such as data analysis, are offered for a fee that covers their full costs.
- For distributed physical RIs, funding models include combinations of in-kind contributions and real cost remuneration, depending on the type of access as outlined above, e.g., TNA vs home use, commercial vs academia. Below are some examples:
 - EUOpenScreen: ERIC members pay the salaries of the facilities' personnel. Projects fund the machine time through grants, where every participating country pays based on the full cost model and according to its level of membership: Members pay 50% of the full economic cost, observers pay an intermediate amount, while non-members (other research and commercial users) pay full costs.
 - SHARE: A sizeable part of the cost is taken up by the leading country and the rest is covered by the remaining ERIC countries.
 - EMPHASIS (a distributed physical RI under construction to be offering access to data and models similarly to ELIXIR): Two funding model scenarios are being considered for covering the envisaged operational costs: in-kind based fees by the member institutions or access-based fees (not preferred).

What are the key weaknesses of current funding models for distributed ESFRI RIs?

- For distributed RIs, calculations for RI operation costs and user access costs are usually different, leading to funding model difficulties.
- The broader the distribution of a research infrastructure, the greater the challenges in funding it, as a greater variety of national policies and legal frameworks must be taken into account, harmonized and synchronized, and a greater number of national contributions must be agreed upon and paid.
- Tensions may arise due to cost and/or usage imbalance between countries.
 - When researchers choose a site in a distributed RI, the scientific environment quality is their only important metric. Nevertheless, fee differences may cause problems. As one of many potential examples, EUOpenScreen national nodes differ in FTE costs. When a solution is available from multiple nodes and the best solution is at the most expensive node, convincing the user to pay and use the best solution can be a challenge.
 - "Give and take" models between national nodes may be very hard to establish, as the level of use and the cost of use between them may be very skewed.

Q5: What are the current (transnational) access models/policies and corresponding funding models used for non-members of ESFRI RIs, in general, and of distributed RIs, in particular? What are their key weaknesses with respect to ensuring effective access? Are there any differences across RIs in different scientific domains?

The discussions about access and funding models for non-members brought out several issues, most of which, however, were more general, as the approach to non-member interactions with RIs are embedded into the general schemes offered by the RIs. Therefore, many of the key elements brought out during the discussions have been incorporated into the comments of the previous questions. Still, there were a few that were specific to non-members and these are outlined below, including the most important issue where there was disagreement among the participants.

- **Key messages**

- Collaboration between members and non-members is encouraged, but there is no uniformity in opinion about the need for distinguishing between members and non-members in access and funding privileges:
 - Opinion #1: A clear distinction should always be maintained in access and funding models, for fairness.
 - Opinion #2: Access should be excellence-based for all, with no difference between members and non-members.

- **Detailed issues and suggestions**

What are the current (transnational) access models/policies and corresponding funding models used for non-members of ESFRI RIs, in general, and of distributed RIs, in particular?

- The model of excellence for basic research could be applied easily to both members and non-members with no distinction between them (as in a large number of ESFRI RIs, e.g., ESO, EMSO, Eurobioimaging and Windscanner).
- For research closer to industrial application (e.g., for medical data RI), such uniformity between members and non-members is more difficult.
- Access to non-members should always be offered to foster international collaboration, thereby reinforcing the European position in the international scientific space. This should be adopted even to the point of an RI reserving a certain (small) “access budget” for its facilities for the international community. Of course, open access is ideal as it supports international collaborations without additional considerations.

What are the key weaknesses of current access and corresponding funding models with respect to ensuring effective access?

- A common bottleneck is that, especially in non-member countries, the scientists who would like to use the infrastructures do not have adequate information about financing such use: ERC, H2020, national agency, etc. Although financing does exist at the national level in many cases, the relevant information is not as visible to the researchers as it should. The cluster projects are very useful in that regard, as their websites provide adequate financing information for several RIs.

Are there any differences across RIs in different scientific domains?

- No significant differences in access or funding models for non-members appear to exist that stem from the particular scientific domain of RIs.

Q6: Given that each ESFRI RI has a different country geometry, inevitably, scientists from several countries do not have member access privileges. Should a pan-European RI access “market” be developed (in the context of a renewed ERA), with access policies and funding models complementary to those of individual ESFRI RIs?

The question of establishing a scheme of pan-European nature for funding transnational access was pivotal in the overall design and delivery of the session, hence, the corresponding discussions for Q6 were equally vibrant. There was a universal sentiment that TNA is suffering and that some funding instruments at the EC level is necessary for truly boosting such activities, which are fundamental to European researchers and the health of the ERA. There was also general agreement on the inappropriateness of the “market” concept and term to describe any reciprocity-based RI service offerings across national borders, with more fitting alternatives being suggested that, nevertheless, maintained the original spirit of the approach. Beyond these overarching issues, several key ideas were brought out on the issues raised by the question, which are given below.

- **Key messages**

- Despite policy drivers (ERA, open science, addressing global challenges, ...) and economic constraints (pooling of resources, avoiding duplicates, efficient use of infrastructures, ...), transnational access without dedicated EU support is often limited.
- So far, only a tiny, inadequate amount has been invested in TNA at the European level. A new dedicated TNA scheme with sizeable funds should be introduced within Horizon Europe.
- The concept of a “market” for RI access is problematic and misleading and should not be adopted.

- **Detailed issues and suggestions**

Should a pan-European RI access “market” be developed (in the context of a renewed ERA)?

- There are several connotations with the term “market” that are not appropriate for the RI space, or in general, in the context of research. What may be appropriate and still carry some of the same fundamental elements is an “exchange of services”. Alternatively, at a lighter level of engagement, one may think of an “exchange of (information about) best practices” and, eventually, of the development of common standards, all of which may be achieved simply by holding specialized workshops.
- Given the heterogeneity in several dimensions that characterize RIs, e.g., their scientific domains, their nature (e.g., physical or data, centralized or distributed), or their access criteria (e.g., excellence-driven or market-driven), a common “access market” would probably be impossible, even if desirable.
- If such an “access market” were to be established, supply and demand of services should be balanced, an effort that could possibly lead to lower access costs for non-members compared to members in some cases.
- Such an “access market” would not be necessary if researchers were well informed about all the funding options in their respective field. More effort should be put towards advertising funding opportunities.
- Approaches in the style of “access market” do exist already, but in order to be effective and accepted more broadly, they require “market” regulation.

Should there be pan-European access and funding models complementary to those of individual ESFRI RIs?

- Pan-European access and funding models should exist, but transnational access by non-members should be always an exception and should be funded at full cost of the RI services used.
- In the context of Horizon Europe, as also emphasized when discussing question Q3, funds for transnational access should remain available in the entire Pillar 1 (not only in the research infrastructures budget, but also in Marie Skłodowska-Curie Actions and ERC), as well as Pillar 2 (thematic areas). This will have two beneficial impacts: RI access costs would be covered by research project budgets; RIs would become more visible to the scientific community.