Enhancing Nordic Research Infrastructure Cooperation

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Excellent research infrastructures are a prerequisite for conducting competitive research of high international quality in dynamic environments. Thus, research infrastructures are topics of common interest for the Nordic countries where Nordic cooperation can make an international contribution.

The NORIA-net «Nordic Research Infrastructure Network» (NRIN) was initiated as a preparatory action in order to strengthen Nordic cooperation on research infrastructure policies, strategies and funding. NRIN has focused on describing similarities and differences between the Nordic countries on research infrastructure policies and aimed to identify actions suitable for cooperation. Although existing national research infrastructure roadmaps are not directly comparable, research infrastructures prioritised in all or most of the Nordic countries, will serve as a platform for increasing Nordic cooperation.

NRIN recommends that efforts are put into current initiatives which have a direct impact on Nordic research infrastructure cooperation. This report contains recommendations on how to expand and add value to Nordic research infrastructure cooperation. The major national research funding agencies in the Nordic countries have been members of NRIN.

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Preface

NordForsk is an organisation under the Nordic Council of Ministers which aims at facilitating cooperation in all fields of research and research-driven innovation when this adds value to work being conducted in the Nordic region. Priority is given to thorough analysis as a basis for funding of research that is judged to have considerable potential to result in long-term knowledge-based progress. Some of NordForsk's preparatory actions are carried out by our «Nordic Research and Innovation Area networks» (NORIA-nets).

Research infrastructure is a topic of mutual interest for all the Nordic countries and an area where Nordic cooperation can make a contribution. The NORIA-net Nordic Research Infrastructure Network (NRIN) was initiated in 2009 in order to strengthen Nordic cooperation on research infrastructure policies, strategies and funding. The major national research funding agencies in the Nordic countries have participated in NRIN.

NRIN has worked towards two aims. The first was to document similarities and differences between the research infrastructure roadmaps in the Nordic countries. This includes priorities, organising principles, funding mechanisms and decision making processes. The second aim was to identify actions suitable for Nordic research infrastructure cooperation. Although existing national research infrastructure roadmaps are not directly comparable, such analysis increases the understanding of where there is added value in Nordic cooperation.

As described above, NRIN's report is not a Nordic research infrastructure roadmap. It is rather a set of recommendations on actions aiming to expand and add value to Nordic research infrastructure cooperation. These recommendations are addressed to NordForsk, but also to Nordic politicians and research funding agencies. They will serve as important input to the ongoing discussion at the Nordic level on how to enhance Nordic cooperation on research infrastructures, including Nordic contributions to international infrastructures.

NordForsk would like to forward our sincere thanks to the enthusiastic and knowledgeable NORIA-net team; Troels Rasmussen, Project Coordinator from Danish Agency for Science Technology and Innovation; Eeva Ikonen from the Academy of Finland; Þorvaldur Finnbjörnsson from Rannís, Iceland; Friðrika Harðardóttir from the Ministry of Education, Science and Culture, Iceland; Odd Ivar Eriksen from The Research Council of Norway, and Per Karlsson from the Swedish Research Council.

Gunnel Gustafsson
Director of NordForsk

Introduction

This report is based on the work of the Nordic Research Infrastructure Network – NRIN. NRIN was established in September 2009 as a joint Nordic network of key actors involved in research infrastructure policy at the national level. The network is funded as a NORIA-net by NordForsk, which also provided secretariat services. The main task of NRIN is to suggest measures to increase Nordic synergies with respect to research infrastructures.

The project has been divided into two stages. In the first stage, the project focused on understanding the details and differences between the Nordic countries on research infrastructure (RI) policy, including the individual RI roadmaps, organising principles, funding mechanisms and decision-making processes. The findings were published in the NRIN interim report of December 2010[1]. Since the publication of the interim report, Iceland has set up a committee charged with the task of recommending organisational principles for RI policy in Iceland. In Finland a new committee for RI will be established in early 2012, with a specific mandate that will include the task of handling the Finnish RI roadmap updates. In both Sweden and Norway updates of the national roadmaps will be published in 2012.

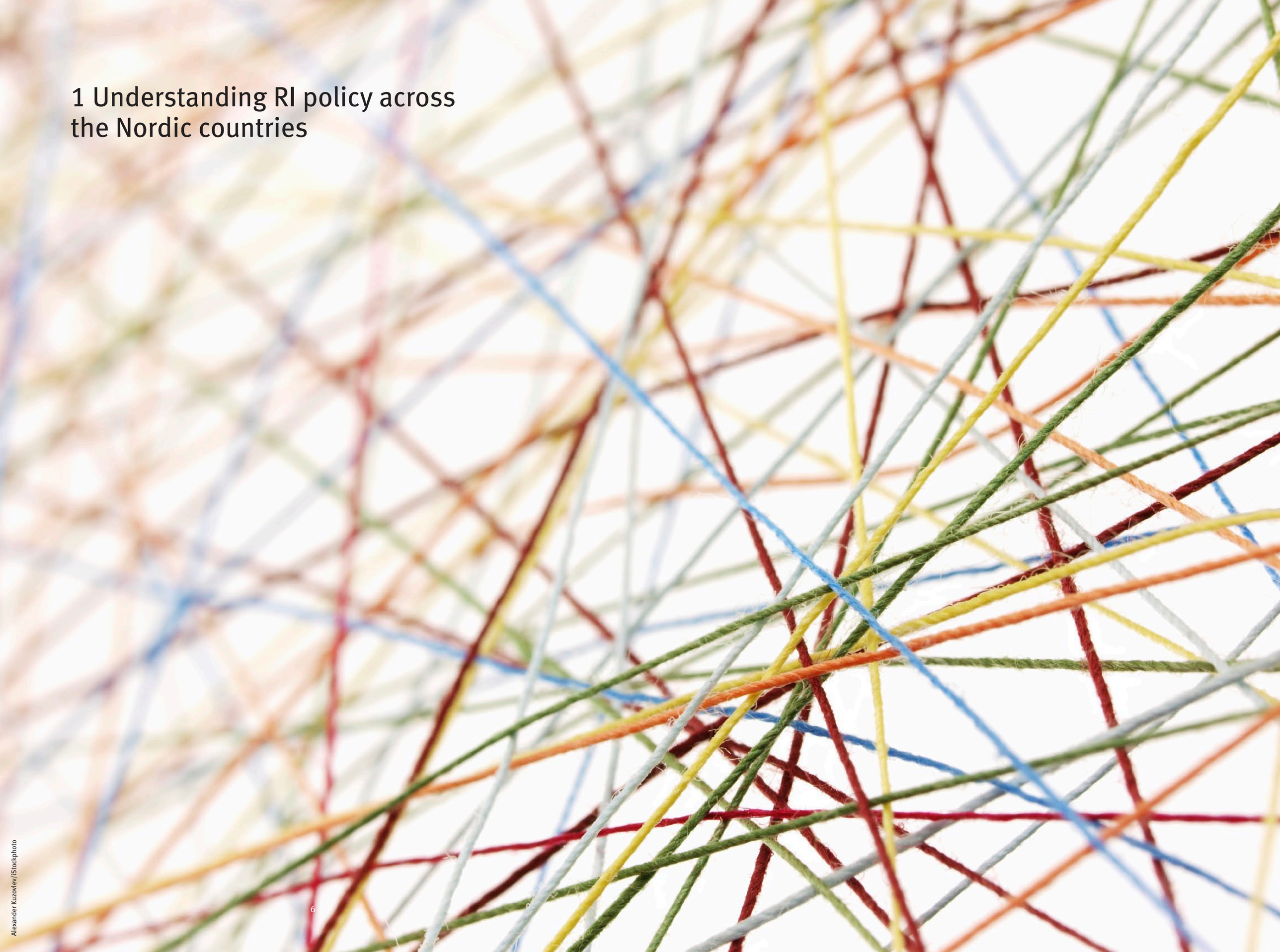
The main purpose of the final stage of the project has been to recommend actions in order to improve the Nordic yield from engagements in research infrastructures. NRIN has made these recommendations to the best of its ability, based solely on the joint opinions of the group members. The recommendatons therefore do not necessarily reflect national priorities or policies.

The pilot evaluation of ESRF and its Nordic membership NORDSYNC conducted by Kjems R&D formed the basis for the recommendations regarding membership of international infrastructure organisations. The evaluation is available for download on the NordForsk website.

An annex to this report provides a comprehensive list of the current status of ESFRI (the European Strategy Forum on Research Infrastructures; http://ec.europa.eu/research/infrastructures/index_en.cfm?pg=esfri) projects across the Nordic countries (as of December 2011).

1 http://www.nordforsk.org/files/nrin-interim-report-december-2010

1 Understanding RI policy across the Nordic countries



Alexander Kuzovlev/iStockphoto

1. Understanding RI policy across the Nordic countries

An important part of NRIN's work in the first project year was to gain a better understanding of the organisational structure and institutional functionality of research infrastructure policy across the Nordic countries. It goes without saying that in order to facilitate a larger degree of collaboration on research infrastructure across the Nordic countries a better understanding of each country's system is essential.

Thematically this has revolved around three general topics: a) national roadmaps; b) international involvements; and c) funding and organisation of RI. The pivotal point in this work has been the national roadmaps on research infrastructure, which have dominated discussions on research infrastructure investments both at the EU level and the national level in the Nordic countries during the past couple of years. Since ESFRI published its first roadmap in 2006, more and more countries have published roadmaps of their own – or are in the process of doing so. This applies to the Nordic countries as well, and it thus seemed logical to look at the outcome of the individual roadmaps and identify which research infrastructures have been prioritised in all or most of the Nordic countries. Those common priorities could then be used as a platform for increasing Nordic collaboration. However, as the work has progressed, it has become clear to NRIN that this task is not as easy as it first appeared. One conclusion that can be drawn from NRIN's first project year is that the national roadmaps on research infrastructure are not directly compatible.

A national research infrastructure roadmap basically consists of a combination of two aims: a) to motivate funding; and b) to prioritise investments. The individual Nordic roadmaps reflect differences in the balance between these two aims as well as differences in RI policy, including organisational issues, funding levels and mechanisms, legal issues and, to some extent, the norms and values of the entire research funding system.

In general terms, roadmaps that are very focused on motivating funding tend to be rather broadly focused on "the big picture" and on the importance of investments in RI. They are in a sense targeted towards funders, which indicates that there is a clear role division between funders and policymakers with respect to research infrastructure. Roadmaps focusing on motivation of funding are usually not very specific about which projects should be funded, the level of funding and the timing of investments. The actual decision-making process is left to the policymakers to deal with incrementally at a later stage. This allows for great flexibility, as funding can be allocated as needed. This is a significant advantage, particularly with regard to international engagements. To outsiders, however, this process seems rather unclear: it is very difficult to glean information about the priorities that have been set unless one follows the process very actively.

Roadmaps in which funding is already secured tend to be much more focused on prioritisation of actual projects. In these cases national funding agencies are usually involved in the process. Roadmaps focusing on prioritisation are generally much more formalised, focusing on criteria and procedures, and they usually include calls for tenders. The advantage is that the decision-making process is very open and transparent to outsiders. The disadvantage is the lack of flexibility, since decisions must follow the timing and procedures embedded in the roadmap.

1.1 Need for Nordic actions – not a Nordic roadmap

As the Nordic roadmaps have different weighting of allocation and prioritisation, using them to identify common actions across the Nordic countries is a challenge. It is important not to focus too broadly on areas of interest in order to overcome the discrepancies between the roadmaps. This might lead to the conclusion that what is needed is a Nordic roadmap on RI, which NRIN does not consider to be the case. In fact, it is the group's strong rcommendation that such an initiative *not* be taken. NRIN recommends that effort be invested in creating actual initiatives that will have a direct impact on Nordic RI collaboration rather than drawing up a Nordic roadmap.

NRIN's analysis has revealed that the principles for RI funding vary significantly among the Nordic countries. Even the concept of a roadmap and how it is used and understood differs widely. Priorities and procedures differ as well, as do timing and funding levels. These in turn reflect noticeable differences in vision, strategy, and prioritisation mechanisms, as well as differences in the norms and values of the research funding systems. In this context, a Nordic roadmap would only make an already very complex field even more complicated.

Given the above, it seems highly unlikely that the Nordic countries would be able to agree on any priorities for a Nordic roadmap, let alone a common pot initiative on research infrastructure. This is reason enough not to realise such an initiative. Roadmaps are extremely resource-intensive if they are to have any real impact. In addition, there is a shift of focus from strategy to implementation in all of the Nordic countries. In the context of the current economic climate, the real challenge is to bring necessary RI into operation. It is NRIN's opinion that any Nordic initiatives should underpin implementation rather than strategy. This is also where NordForsk could play an important and constructive role, which would create real value added for the Nordic countries.

1.2 Nordic collaboration on ESFRI implementation

According to NRIN, Nordic collaboration on RI will be most beneficial in relation to targeted ESFRI projects. Since most ESFRI projects are still in the preparatory stage, Nordic collaboration could have a significant impact on their development both at the Nordic and European levels. This is why the group has primarily directed its focus towards this area.

The following criteria were used to identify relevant ESFRI projects:

- At least three Nordic countries must have expressed an interest in the project
- The ESFRI project must have the potential for further Nordic collaboration, which would add value to the project
- Nordic collaboration on a particular ESFRI project should be feasible and desirable
- The ESFRI projects must have national support, perspective and a platform in each of the Nordic countries, as this will give Nordic collaboration a better chance of success
- Collaboration must clearly make the Nordic countries more attractive as partners in the ESFRI projects and strengthen their influence in decision-making related to the projects

These criteria have helped to guide NRIN in its efforts to identify projects worthy of collaboration at the Nordic level (and they should be used to guide future Nordic ESFRI collaboration). In terms of the first criterion – whether there is national interest – NRIN has compiled a simplified presentation (Annex 3.3) of the ESFRI projects in which the Nordic countries have national interests. When comparing the individual countries' priorities on this list, it is apparent that Health and the Environment are two main areas of interest shared by all of the Nordic countries. These are also areas in which there are already very strong shared Nordic scientific traditions as well as established Nordic collaboration between scientists.

Furthermore, the areas of overlap and the potential for Nordic synergies lie mainly in distributed RI. This is why legal and other issues regarding data sharing and eInfrastructure are of key importance in relation to any potential Nordic RI initiatives.

2. Recommendations

HUNT Biobank/NTNU

2. Recommendations

2.1 Nordic collaboration on ESFRI implementation

Recommendation: *National engagements in ESFRI projects of common strategic priority in the Nordics should be coordinated.*

Why? *Many ESFRI projects already have national support, perspective and a platform in each Nordic country. Collaboration will make the Nordic countries more attractive as partners in the ESFRI projects and strengthen their influence in decision-making regarding the projects. The build-up of Nordic RI platforms in relation to ESFRI projects will ensure value for money on national investments almost independently of the progress of the pan-European projects. This is particularly relevant for distributed RIs.*

How? *NordForsk should set up targeted projects to coordinate national engagements in ESFRI projects in the Nordic countries. The project to facilitate Nordic cooperation on biobanks is a good example of one such project that NordForsk has helped to establish.*

Background and details
Nordic collaboration on RI will yield the greatest benefit in relation to ESFRI projects. In addition, the areas of overlap of and the potential for Nordic synergies lie mainly in distributed RI. Legal and technical issues on data sharing and eInfrastructure are some of the largest challenges relating to distributed RI, which is why any future Nordic RI initiatives should place special focus on these issues.

When comparing the Nordic countries' individual priorities on the ESFRI Roadmap (see Annex 3.2), it is apparent that the main areas of interest extending across these countries are distributed RIs within Health (BBMRI, ELIXIR, EuroBioImaging and EATRIS), the Environment (LIFEWATCH, ICOS and EPOS) and Social Sciences (CLARIN and CESSDA). These are also areas in which there are very strong shared Nordic scientific traditions as well as good Nordic collaboration between scientists.

NRIN has identified population-based biobanks as one of the most important areas for Nordic collaboration due to the major scientific synergies that will be created as well as the auspicious timing of such an initiative. A coordinated Nordic initiative will be immensely beneficial to the individual countries in the process of building up their national research infrastructure, as it will eventually allow researchers to draw on population and biobank data across the Nordic countries. Such an initiative would ensure that the Nordic region maintains its position as the scientific hub of epidemiological research. In addition, the ESFRI project BBMRI is on its way to becoming a pan-European biobank research infrastructure. The BBMRI has its centre of gravity in disease-based biobanks. However, because the BBMRI will become instrumental in harmonisation efforts on standards and technical solutions across Europe, it will have a significant influence on both disease-based and population-based biobanks. For this reason, it is vital that the Nordic countries are in a position to influence the outcome of the BBMRI on harmonisation issues, which may be done by establishing a joint Nordic biobank initiative.

The potential for Nordic collaboration in ELIXIR should be further explored. The project has some very challenging aspects in terms of eScience and eInfrastructure dimensions. However, NRIN does not have any insight into the progress of the project. NRIN does not consider Euro-BioImaging and EATRIS to have sufficient potential for Nordic synergies to warrant a joint project. Euro-BioImaging and/or national bioimaging facilities could have potential for enhancing networking between Nordic researchers and sharing of resources.

Although the ESFRI projects are pan-European, there are projects in the earth and environmental sciences that are of very clear regional importance for the Nordic countries. Compared to the rest of Europe, the Nordic countries are small in terms of population; however, they cover large territories. The regional dimension in projects such as EPOS (plate tectonics), ICOS (carbon emission) and LIFEWATCH (biodiversity) is therefore critical. The data each country needs are first and foremost from neighbouring countries. Nordic collaboration would make a very strong and positive contribution to the relevant ESFRI projects and would also ensure that the Nordic potential of the relevant ESFRI projects is realised.

2.2 Action towards data sharing

Recommendation: *The Nordic countries should identify and possibly remove legal barriers to the cross-border sharing of data.*

Why? *NRIN is aware of the efforts to identify barriers to data sharing across the Nordic countries in the Nordic biobank initiative and the eScience globalisation initiative. However, there is an URGENT need to address legal issues regarding cross-border data sharing and the work to be done is far beyond the scope of any current initiative taken at the Nordic level.*

How? *A task force could be set up, including representatives of the relevant data protection agencies at the Nordic level under the Nordic Council of Ministers, with the specific task of addressing legal issues relating to sharing data. The key is to involve relevant agencies, as this is an issue that cannot be dealt with at the researcher level.*

Background and details
If current unclear legal issues remain unresolved, it will likely have a negative impact on the progress of many of the most valuable Nordic initiatives on RI because the main synergy is in data sharing. The cross-border sharing of data is critical in connection with the Nordic biobank initiative, other registry-based research, survey data and Nordic collaboration on key ESFRI projects, including ELIXIR.

2.3 Nordic synergies with respect to administrative participation in international RI meetings

Recommendation: *Increase Nordic information exchange and coordination of administrative participation in international RI meetings.*

Why? *All of the Nordic countries have limited administrative resources when it comes to participating in international RI organisations and projects. There is potential to boost administrative efficiency, enhance the impact of the Nordic positions and improve the quality of Nordic administrative efforts.*

How? *Let one or two Nordic countries represent the others at international RI meetings. When this is not suitable, meetings of the Nordic countries should be organised prior to the international meetings in order to identify common Nordic positions, develop strategies to pursue them, and/or discuss and analyse upcoming agenda items to gain a better understanding of them.*

Background and details
The number of RI projects that the Nordic countries are involved in has grown considerably during the past five years, due in great part to the ESFRI process. Typically a Nordic country is now engaged, to a varying degree, in approximately 25 ESFRI projects and international RI organisations (see Annex 3.1 and 3.2). Engagement in the planning, construction and/or operational phase requires each of the Nordic countries to have representatives on governing boards, councils, advisory committees and/or working groups. Attending the meetings of all of these groups, which usually take place outside of the Nordic countries, puts considerable strain on personnel resources. A single meeting, at which only decisions of minor importance are expected to be made but which are nonetheless important to monitor, could take up more than one workday including travelling.

NRIN suggests that personnel resources could be used more efficiently by letting one or two Nordic countries represent the other Nordic countries at some of the international RI meetings. This is particularly relevant for meetings where there are no important decisions on the agenda, but consist largely of items for information and discussion. Many meetings of mature international RI organisations such as CERN, ESO and EMBL with a well-established organisational structure belong to this category. If it is agreed that only one Nordic representative needs to attend a meeting, he/she could convey the views and positions from the other Nordic countries as well.[2]

In the case of meetings where important decisions are taken, it is more difficult to envisage a single common Nordic representative.[3] However, in this case Nordic coordination could still be beneficial in improving the administrative efforts of the Nordic countries. The Nordic delegates have different experiences, competencies and networks and could thereby discuss items on the agenda from different angles. A pre-meeting where the upcoming agenda items are discussed and scrutinised would help the delegates to gain a better understanding of the consequences of decisions taken at the international RI meeting and help them to form well-based opinions. This could even make it possible to identify common views and positions on important issues, and develop a strategy on how to jointly put forward these views to achieve maximum impact.

In summary, Nordic coordination in connection with international RI meetings could involve the following measures:

1. One or two countries representing the others at meetings
2. Identifying and pursuing common Nordic positions
3. Discussing upcoming agenda items to understand them better

2.4 Evaluation of memberships

Recommendation: *International memberships in research infrastructure organisations should be evaluated at the Nordic level.*

Why? *Common Nordic evaluations of research infrastructures will allow each of the participating countries to assess and possibly adjust their national involvements in research infrastructures. Evaluations will also form a much stronger basis for discussing further Nordic cooperation. The evaluations will establish a common platform for learning and improvement in relation to research infrastructures of common interest. Each country is expected to become involved in a growing number of international research infrastructures, and evaluations of international memberships will provide best-practice tools for organising these memberships at the national level.*

2 In order to collect these views a pre-meeting would be required, preferably by phone or online; otherwise the time saved by having a common representative will be limited. This pre-meeting cannot take place until the agenda and meeting documents are released, which usually occurs a week or so prior to the meeting. After the meeting the common representative should write a report, to be circulated to the other Nordic delegates within a couple weeks.

3 Formally this would require that he or she is equipped with a mandate from the other Nordic countries. It should also be taken into consideration that meetings are dynamic and sometimes result in novel proposals which are put on the table for a vote.

How? *NRIN believes that it would be very valuable for NordForsk to initiate pan-Nordic membership evaluations in close cooperation with national stakeholders.*

Background and details
The successful Nordic evaluation of ESRF and NORDSYNC clearly demonstrated the value of a comparative evaluation. Looking at each national membership in reference to other Nordic memberships makes the pros and cons of the memberships much more visible than non-comparative evaluations of one country's memberships.

The ESRF evaluation showed that it is possible to obtain a substantial amount of information at modest cost by focusing the evaluation on the organisational aspects and thus on policy development alone. NRIN recommends that full-scale scientific evaluations are only conducted at the national level.

EMBL, CERN and ESO are the most obvious RIs for pan-Nordic evaluations. Although ESA might be suitable for evaluation in its own right, the task might be too complex. A thematic comparative evaluation focusing on industrial involvement in international RIs is also highly relevant.

2.5 Nordic partnerships in large-scale RIs

Recommendation: *Joint Nordic partnerships in research infrastructures should be considered for new RI involvements at the international, European and/or regional levels.*

Why? *Nordic partnerships can maximise the cost-effectiveness of new RI involvement, and in certain cases they may even be the only way of ensuring access to needed RI for Nordic scientists. Such partnerships could take the form of joint membership, establishment of a Nordic node, or joint Nordic investment in RI-related eInfrastructure or scientific instruments. NORDSYNC, NORDUNET, NDGF (now NeIC), the Nordic EMBL partnership and the Swedish/Finnish FAIR consortium are all examples of Nordic partnerships associated with large-scale RIs.*

How? *Establishment of joint Nordic partnerships must be based on joint efforts between national stakeholders and needs to be handled on a case-by-case basis. Initial discussions and identification of joint Nordic interests in RI partnerships could be handled in the Nordic RI network suggested in Recommendation 2.7.*

Background and details
In construction of new regional or international research infrastructures, a minimum contribution necessary for participation/build-up could be achieved through joint Nordic cooperation. In some cases Nordic platforms could also improve overall scientific impact.

Based on the findings in the NORDSYNC evaluation by Jørgen Kjems, the NORDSYNC consortium model is a practical example of joint Nordic participation that will be useful in future discussions and decisions regarding other consortia or joint efforts. The report concludes that NORDSYNC has been a success in that the scientific communities in the Nordic countries have enjoyed full and unrestricted access to ESRF, which has been exploited by leading groups to obtain a relatively large share of the beam time and to become deeply involved in the development of ESRF. NORDSYNC has become a respected partner due to the high quality of the use combined with the Nordic tradition for flexibility, consensus and pragmatism in delicate matters such as budgets, fees for overuse and access. The early engagements in ESRF have been encouraged and supported by the employment of key staff from the Nordic countries in both shorter and longer term positions.

NRIN believes that the consortium model could inspire new engagements in some of the research infrastructure projects already on the ESFRI list, as well as future international RI engagements.

2.6 Stimulating transnational use of RI in the Nordic countries

Recommendation: *NordForsk should continue to fund joint use of national research infrastructures in the Nordic countries.*

Why? *Flexible and targeted NordForsk grants are very effective, as they can be used directly and without the coordination normally required for co-funded projects. This is one of the most important roles for NordForsk to play in relation to RIs.*

How? *Support tools such as the Joint Nordic Use of Research Infrastructure or Researcher Network grants may be a very valuable contribution by NordForsk towards joint Nordic RI collaboration.*

Background and details

To make the most of the instruments NordForsk has at its disposal, there needs to be a clear strategic focus and the activities supported by NordForsk must be in line with national priorities and roadmaps. Any RI-related initiatives must be established with specific objectives and deliverables, such as setting up a Nordic node for ESFRI projects.

2.7 Establish a new Nordic RI network/forum

Recommendation: *The Nordic countries should continue to strengthen the coordination of activities relating to RIs. NRIN believes this should be achieved by continuing the networking activities developed under the NRIN project. However, rather than prolonging the current NRIN NORIA-net, a new group should be put together with a mandate from the national funders.*

Why? *It is clear that Nordic policy coordination on RIs is fruitful and that further coordination is needed. RI policy is a very dynamic and multifaceted field. Organisations must be very flexible and able to encompass all of the various aspects of RI policy. NRIN believes that the only way to establish and sustain a viable and dynamic Nordic RI collaboration is to work on a case-by-case basis and involve relevant stakeholders when needed. For this reason a new forum should have its centre of gravity in the national funders.*

Having such a group to consult with on RI-related activities could also be an important asset for NordForsk.

How? *The current NRIN group could form the backbone of a new Nordic RI forum, functioning as national contacts for Nordic RI collaboration. The aim is to ensure overall coordination of activities, sharing of information, proposed joint Nordic activities and the involvement of relevant stakeholders, when needed, in addressing different aspects of RI policy. The list of possible topics is long, but could include ESFRI projects, national investments, legal issues, eInfrastructure issues, NordForsk initiatives, training activities, ERIC, current RI memberships, new memberships, evaluations and foresight studies, as well as the EU Framework Programmes.*

Background and details

Future investments in RI in the Nordic countries should be coordinated on a case-by-case basis. The Nordic countries themselves should maintain focus on identifying opportunities for cooperation on RI as well as specific activities that would be beneficial in a Nordic perspective. The identification and examination of common priorities and mutual interest in specific RIs should result in specific coordinated actions at the Nordic level. The Nordic funders also have a responsibility to ensure that relevant positions and recommendations are conveyed to NordForsk.

In all of the Nordic countries focus is shifting from strategy to implementation. It is NRIN's opinion that potential Nordic initiatives should support implementation rather than strategy. This is also an area where NordForsk could play an important and constructive role, which would create real value added for the Nordic countries.

It is important that potential Nordic initiatives are in line with national policy decisions – specifically regarding ESFRI projects, which are complex and delicate to handle. NordForsk and the national funders should work together to ensure that valuable information regarding national implementation of ESFRI projects is communicated to NordForsk. This includes the actual state of play of an ESFRI project, including financial or governance issues and overall ERIC issues. This would help to guide NordForsk's decision about whether to support a Nordic RI initiative linked to an ESFRI project. Gathering informal opinions from the national funders on a case-by-case basis and establishing a good working relationship.

The role and tasks of the Joint Committees for Nordic Research (NOS) regarding research infrastructures should be clarified, in order to ensure that RI-related topics are not discussed or decisions taken in parallel or without the inclusion of national RI funders. Prior to taking decisions on national investments in new or upgraded RIs, comparable RIs in the neighbouring Nordic countries should be identified and opportunities for transnational access exploited. Over time, this will develop a stronger Nordic region where national RIs are shared and used across borders.

2.8 Actions towards eInfrastructure

Recommendations: *The possibility of establishing joint Nordic eInfrastructure platforms for data-intensive distributed RIs should be explored, particularly those which would be linked to one or more ESFRI projects. The environmental projects ICOS, LIFEWATCH and EPOS and the biomedical projects ELIXIR and BBMRI should be given priority.*

Why? *The establishment of joint Nordic eInfrastructure platforms has obvious value added. There is untapped potential in the environmental, biological and medical sciences as well as the social sciences and humanities. This potential can only be realised through the transfer of knowledge and expertise from the more established eScience fields such as physics, chemistry and computational sciences to the emerging eScience fields.*

How? *There is currently a specific focus on eScience at NordForsk with the Nordic eScience globalisation initiative and the new Nordic organisation on computing and storage, NeIC, involving the former Nordic DataGrid Facility (NDGF). The "Nordic eInfrastructure Collaboration" (NeIC) will be administered by NordForsk as of 1 January, 2012. These initiatives should focus on emerging eScience research fields.*

Nordic initiatives should encourage and support the use of eScience and eInfrastructure in all scientific disciplines. However, they should specifically focus on supporting research fields such as the environmental, biological and medical sciences which are less experienced with eScience, but have tremendous eScience potential and challenges.

Background and details

One of the main eScience challenges facing national funders today is to bridge the knowledge gap between experienced eInfrastructure users and users that are less experienced with eScience. Based on past experience, the largest challenge seems to be to establish eScience initiatives that cater to all users and scientific fields, not only to experienced users.

3. Annexes

3. Annexes

This section contains three lists which provide an overview of the status and implementation of the Nordic countries' international and ESFRI RI involvements.

3.1 The Nordic countries' international RI memberships

Nordic involvement in international RIs, as shown in the table below, covers most research areas. Involvement differs in character and includes large experimental facilities (e.g. CERN), a database for social sciences (ESS) and research institutes (e.g. EUI). In some cases involvement is indirect, through membership in the EU (JET, ITER) or OECD (Halden Reactor Project).

Table 1. The table shows the involvement of the Nordic countries in international RIs; green indicates membership. Iceland is not a member of CERN, but there is a cooperation agreement between CERN and Iceland from 1996.

	Denmark	Finland	Norway	Iceland	Sweden
CERN - The European Organization for Nuclear Research	■	■	■		■
EISCAT - European Incoherent Scatter Scientific Association		■	■		■
EMBL - European Molecular Biology Laboratory	■	■	■	■	■
ESA - European Space Agency	■	■	■		■
ESO - European Southern Observatory	■	■			■
ESRF - European Synchrotron Radiation Facility	■	■	■		■
ESS - European Social Survey	■	■	■		■
EUI - European University Institute	■	■	■		■
GBIF - Global Biodiversity Information Facility	■	■	■	■	■
GEANT	■	■	■	■	■
IARC - International Agency for Research on Cancer	■	■	■		■
ICDP - International Continental Scientific Drilling Program		■	■	■	■
IceCube - South Pole Neutrino Observatory					■
IIASA - The International Institute for Applied Systems Analysis		■	■		■
ILL - Institut Laue-Langevin	■				■
INCF - International Neuroinformatics Coordination Facility		■	■		■
IODP - Integrated Ocean Drilling Program - Including ECORD	■	■	■	■	■
ITER - International Thermonuclear Experimental Reactor		■			■
JET - Joint European Torus	■	■			■
MAX Synchrotron Radiation Facility (MAX-lab)		■			■
NOT - Nordic Optical Telescope	■	■	■	■	■
OECD Halden Reactor Project	■	■	■		■
SNBL/ESRF (Swiss-Norwegian Beam Line)			■		

The Nordic countries collaborate on some of the RIs. The membership of Denmark, Finland, Norway and Sweden in ESRF is through a consortium, NORDSYNC, where each country pays according to its use. The Nordic Optical Telescope (NOT) is a joint Nordic facility where all countries contribute according to a fixed distribution key (the key will most likely be changed to reflect the use of the experiment). EISCAT is a distributed RI with facilities in Finland, Norway and Sweden where also China, Germany, Japan and UK participate.

3.2 Short description - Projects on the ESFRI Roadmap

This section contains short descriptions of the 51 projects on the ESFRI list.
Please consult Annex 3.4 for an overview of the status of the ESFRI projects across the Nordic countries.

Social Sciences and Humanities

CESSDA - **Facility to provide and facilitate researcher access to high-quality data for social sciences** *www.cessda.org*
CESSDA is a distributed RI that provides and facilitates researcher access to high-quality data and supports their use. It promotes the acquisition, archiving and distribution of electronic data, and encourages the exchange of data. In implementation phase.

CLARIN - **The Common Language Resources and Technology Infrastructure** *www.clarin.eu*
CLARIN is a large-scale pan-European coordinated infrastructure effort to make language resources and technology available and useful to scholars of all disciplines, in particular the humanities and social sciences. Implementation expected before end of 2012.

DARIAH - **The Digital Research Infrastructure for the Arts and Humanities** *www.dariah.eu*
DARIAH aims to conceptualise and build an infrastructure in support of ICT-based research practices in the arts and humanities and to support researchers in the creation and use of research data and tools. Implementation expected before end of 2012.

ESS - The European Social Survey - **Upgrade of the European Social Survey, set up in 2001 to monitor long-term changes in social values** *www.europeansocialsurvey.org*
The European Social Survey is a long-term pan-European distributed instrument designed to chart and explain the interaction between Europe's changing institutions and the attitudes, beliefs and behaviour patterns of its diverse populations. In implementation phase.

SHARE - **A data Infrastructure for the socio-economic analysis of ongoing changes due to population ageing** *www.share-project.org*
SHARE is a pan-European social science project. SHARE ERIC is the upgrade into a long-term research infrastructure of a multidisciplinary and cross-national panel database of micro-data on health, socio-economic status and social and family networks of about 45,000 Europeans aged 50 or over. In implementation phase.

Environmental sciences

COPAL - **Heavy Payload Long-endurance Tropospheric Aircraft** *www.eufar.net/copal*
COPAL aims at providing the European scientific community in the field of environmental and geosciences with a unique research aircraft platform capable of reaching and operating in any remote area in the world.

EISCAT_3D - **The next-generation European incoherent scatter radar system** *www.eiscat3d.se/*
EISCAT_3D will be a three-dimensional imaging radar for atmospheric and geospace research, which constitutes an upgrade to EISCAT, an existing international infrastructure based in Europe and devoted to the study of the upper atmosphere, ionosphere and geospace. Implementation expected before end of 2012.

EMSO - **European Multidisciplinary Seafloor Observatory** *www.emso-eu.org*
EMSO is a research infrastructure for long-term permanent monitoring of the ocean margin environment around Europe.

EPOS - **European Plate Observing System** *www.epos-eu.org*
EPOS will create a single sustainable, permanent observational infrastructure, integrating existing geophysical monitoring networks, local observatories and experimental laboratories in Europe and adjacent regions. It will coordinate the currently scattered facilities into one distributed, coherent multidisciplinary RI.

EURO-ARGO - **Global Ocean Observing Infrastructure** *www.euro-argo.eu*
Argo is a global ocean observing system with the primary goal of maintaining the array of 3,000 floats over the next 10 to 20 years. Implementation expected before end of 2012.

ICOS - Integrated carbon observation system *www.icos-infrastructure.eu*
ICOS will provide a distributed infrastructure for standardised long-term high precision monitoring of atmospheric and oceanic greenhouse gas concentrations, ecosystem fluxes and essential carbon cycling variables. Implementation expected before end of 2012.

IAGOS - **In-service Aircraft for a Global Observing System** *www.iagos.org*
IAGOS will be established and operated as a distributed infrastructure for long-term observations of atmospheric composition, aerosol and cloud particles on a global scale from a fleet of initially 10 to 20 long-range in-service aircraft of internationally operating airlines. Implementation expected before end of 2012.

LIFEWATCH - **Science and Technology Infrastructure for Research on Biodiversity and Ecosystems** *www.LIFEWATCH.eu*
LIFEWATCH is an eScience and technology infrastructure for biodiversity and ecosystem research.

SIOS - **The Svalbard Integrated Arctic Earth Observing System** *www.unis.no/SIOS*
The goal of SIOS is to establish an observational RI for the Arctic Earth System, integrating studies of geophysical, chemical and biological processes from the research and monitoring platforms.

Energy

ECCSEL - **European Carbon dioxide Capture and Storage Laboratory Infrastructure** *www.eccsel.org*
The ECCSEL facility combines three approaches to capture (pre- and post-combustion and O_2/CO_2 –oxy-fuel recycle combustion capture) and three approaches to carbon storage (aquifers, depleted oil/gas fields, coal bed methane).

HiPER - **High Power laser Energy Research facility** *www.hiper.org*
The primary goal of the HiPER project is to demonstrate the feasibility of laser fusion energy as a future energy source.

IFMIF - **International Fusion Materials Irradiation Facility** *www.frascati.enea.it/ifmif/*
IFMIF is an accelerator-based very high-flux neutron source utilising the deuteron lithium-stripping reaction with the aim of providing a timely and suitable database on irradiation effects on materials needed for the construction of a fusion reactor.

JHR - **High-flux reactor for fission reactors material testing** *www-cadarache.cea.fr/rjh/index.html*
This new research reactor will allow high-flux neutron irradiation experiments dedicated to the study of materials and fuel behaviour under irradiation with sizes and environment conditions relevant for nuclear power plants in order to optimise efficiency and demonstrate safe operations of existing power reactors as well as to support future reactor design. In implementation phase.

EU-SOLARIS - **European Solar Research Infrastructure for Concentrating Solar Power** *www.ctaer.com*
EU-SOLARIS is a networking approach from outstanding solar research centres in five European countries to support the scientific and technological development of Concentrating Solar Power Systems.

MYRRHA - **European Fast Spectrum Irradiation Facility** *http://myrrha.sckcen.be/*
MYRRHA (Multipurpose hYbrid Research Reactor for High-Tech Applications) will be an innovative pan-European large-scale RI. It is a hybrid system that consists of the combination of a high-energy proton linear accelerator and a lead alloy-cooled fast-spectrum irradiation facility.

WINDSCANNER - **The European WindScanner Facility** *www.windscanner.eu*
WindScanner is a unique, distributed RI providing fundamentally new knowledge about the wind, which will lead to more efficient, stronger and lighter wind turbines.

Biological and Medical Sciences

BBMRI - **Biobanking and Biomolecular Resources Research Infrastructure** *www.bbmri.eu*
BBMRI will be a pan-European distributed infrastructure of existing and new biobanks and biomolecular resource centres. It will provide access to human biological samples that are considered essential raw material for the advancement of biotechnology, human health and research and development in the life sciences. Implementation expected before end of 2012.

EATRIS - **European Advanced Translational Research Infrastructure in Medicine** *www.eatris.eu*
EATRIS will provide infrastructure allowing faster and more efficient translation of research discoveries into new products to prevent, diagnose or treat diseases. Implementation expected before end of 2012.

ECRIN - **European Clinical Research Infrastructures Network** *www.ecrin.org*
ECRIN is designed to bridge the fragmentation of clinical research in Europe through integration of national networks of clinical RIs. It will provide 'one-stop shop' services to investigators and sponsors in multinational clinical research studies. Implementation expected before end of 2012.

ELIXIR - **European LifeScience Infrastructure for Biological Information** *www.elixir-europe.org*
ELIXIR will be a secure, rapidly evolving platform for collection, storage, annotation, validation, dissemination and utilisation of biological data. It will comprise a distributed, interlinked collection of core and specialised biological data resources. Implementation expected before end of 2012.

EMBRC - **European Marine Biological Resource Centre** *www.embrc.eu*
EMBRC will comprise a consortium of key European marine biological and molecular biology laboratories.

EU-OPENSCREEN - **European Infrastructure of Open Screening Platforms for Chemical Biology** *www.eu-openscreen.eu*
EU-OPENSCREEN will be an open-access infrastructure for the development of bioactive small molecules.

EURO-BIOIMAGING - **European Research Infrastructure for Biomedical Imaging** *www.eurobioimaging.eu*
Euro-BioImaging will be a European RI for biomedical imaging ranging from basic biological imaging to medical imaging of humans and populations.

ERINHA - **European Research Infrastructure on Highly Pathogenic Agents** *www.erinha.eu*
ERINHA will be a pan-European distributed RI aiming to reinforce European coordination and capacities for the study and surveillance of highly pathogenic microorganisms. It will provide open access to state-of-the-art BSL4 facilities.

INFRAFRONTIER - **European infrastructure for phenotyping and archiving of model mammalian genomes** *www.infrafrontier.eu*
Infrafrontier will be a distributed RI offering access to systemic phenotyping, archiving and distribution of mouse models for human diseases to the biomedical research community. Implementation expected before end of 2012.

INSTRUCT - **Integrated Structural Biology Infrastructure** *www.structuralbiology.eu*
INSTRUCT is a European distributed infrastructure that will promote integrative science by providing open access to state-of-the-art structural biology technologies to researchers in member countries. Implementation expected before end of 2012.

ANAEE - Infrastructure for ANalysis and Experimentation on Ecosystems *www.anaee.com*
ANAEE aims at developing a coordinated set of experimental platforms across Europe to analyse, detect and forecast the responses of ecosystems to environmental and land-use changes.

ISBE - **Infrastructure for Systems Biology - Europe** *www.erasysbio.net*
ISBE will (I) interconnect hubs of technological excellence in Systems Biology, (II) establish and make available repositories of data and models, and (III) enable real-time connections within and between components of (I) and (II) and with external 'user' laboratories, through the provision of high-performance connections to existing high-capacity electronic network infrastructures.

MIRRI - **Microbial Resource Research Infrastructure** *www.embarc.eu* and *www.gbrcn.org*
MIRRI will be a pan-European distributed RI that will provide microbiological services facilitating access to high-quality microorganisms, their derivatives and associated data for research, development and application.

Materials and Analytical Facilities

EMFL - European Magnetic Field Laboratory *www.emfl.eu*
EMFL will be a dedicated magnet field laboratory providing the highest possible fields (both continuous and pulsed) to European researchers. It will be operated as a single distributed RI which integrates and upgrades the four existing major European high-magnetic field laboratories: the Grenoble High Magnetic Field Laboratory (GHMFL), Laboratoire National des Champs Magnétiques Pulsés (LNCMP) in Toulouse, Hochfeld-Magnetlabor Dresden (HLD), and the High Field Magnet Laboratory (HFML) in Nijmegen.

ESRF - **Upgrade of the European Synchrotron Radiation Facility** *www.esrf.fr*
ESRF, located in Grenoble, France, is a joint facility supported and shared by 17 European countries and Israel. It operates the most powerful high-energy synchrotron light source in Europe and brings together a wide range of disciplines including physics, chemistry and materials science as well as biology, medicine, geophysics and archaeology. In implementation phase.

European XFEL - **European X-Ray Free-Electron Laser Facility** *www.xfel.eu*
The European X-Ray Free-Electron Laser, under construction in Hamburg, Germany, will be a world-leading facility for the production of intense, short pulses of X-rays for scientific research in a wide range of disciplines. In implementation phase.

ESS - **European Spallation Source** *http://ess-scandinavia.eu/*
The European Spallation Source will be the world's most powerful long-pulse source of neutrons at 5 MW. The ESS will be co-hosted by Sweden and Denmark and built in Lund with a Data Management Centre located in Copenhagen. Additionally, an ESS Laboratory Test Facility and Accelerator Components Factory will be located in Bilbao, Spain. Implementation expected before end of 2012.

ILL 20/20 - **Upgrade of the European Neutron Spectroscopy Facility** *www.ill.eu*
The reactor-based laboratory at the Institut Laue Langevin (ILL) is recognised as the world's most productive and reliable source of slow neutrons for the study of condensed matter. ILL 20/20 upgrade plans to optimise its potential to deliver to users' needs in the future. In implementation phase.

EUROFEL (ex-IRUVX-FEL) *www.eurofel.eu*
The EuroFEL Consortium (previously called IRUVX-FEL) will integrate the national facilities based on Free Electron Laser (FEL) currently in operation or emerging in Europe into a single, distributed and internationally open RI.

Physical Sciences and Engineering

CTA - **Cherenkov Telescope Array** *www.mpi-hd.mpg.de/CTA*
CTA will be an advanced facility for ground-based high-energy gamma-ray astronomy.

E-ELT - **European Extremely Large Telescope** *www.eso.org/projects/e-elt*
E-ELT project will maintain and reinforce Europe's position at the forefront of astrophysical research.

ELI - **Extreme Light Infrastructure** *www.extreme-light-infrastructure.eu*
ELI will be an international RI for the investigation and applications of laser matter interaction at more than six orders of magnitude higher than today's state of the art and will become the first genuinely international large-scale laser facility. Implementation expected before end of 2012.

FAIR - **Facility for Antiproton and Ion Research** *www.gsi.de/fair*
FAIR will provide high-energy primary and secondary beams of ions of highest intensity and quality, including an "antimatter beam" of antiprotons, allowing cutting-edge research in five different disciplines of physics. In implementation phase.

KM3NeT - **Kilometre Cube Neutrino Telescope** *www.km3net.org*
KM3NeT will be a deep-sea RI in the Mediterranean Sea hosting a cubic-kilometre-sized deep-sea neutrino telescope for astronomy based on the detection of high-energy cosmic neutrinos and giving access to long-term deep-sea measurements.

SKA - **Square Kilometre Array** *www.skatelescope.org*
The SKA will be the next-generation radio telescope.

SPIRAL2 - **Facility for the production and study of rare isotope radioactive beams**
www.ganil-spiral2.eu/spiral2
SPIRAL2 is a new European facility to be built at the GANIL laboratory in Caen, France. The project aims to deliver stable and rare isotope beams with intensities not yet available with present machines. In implementation phase.

eInfrastructures

PRACE - **Partnership for Advanced Computing in Europe** *www.prace-project.eu*
PRACE is a European strategic approach to high-performance computing. It concentrates the resources distributed in a limited number of world-class, top-tier centres into a single infrastructure connected to national, regional and local centres, forming a scientific computing network. In implementation phase.

3.3 Involvement in ESFRI projects across the Nordic countries

Here is an overview of Nordic involvements in ESFRI projects, followed by a comprehensive list showing the status of the individual ESFRI projects across the Nordic countries as of December 2011.

TABLE 2: Nordic involvements in ESFRI projects across the Nordic countries

	ESFRI projects	Denmark	Norway	Sweden	Finland	Iceland
Social Sciences and Humanities	CESSDA	■	■	■	■	
	CLARIN	■	■	■	■	■
	DARIAH	■			■	
	ESSurvey	■	■	■	■	■
	SHARE	■				
Environmental Sciences	COPAL				■	
	EISCAT_3D		■	■		
	EMSO		■	■		
	EPOS	■	■	■		■
	EURO-ARGO		■			
	IAGOS					
	ISOS	■	■	■	■	
	LIFEWATCH	■	■	■	■	■
	SIOS	■	■	■		
Energy	ECCSEL	■	■			
	HiPER					
	WINDSCANNER	■	■			
	EU-SOLARIS					
	MYRRHA					
	IFMIF					
	JHR				■	
Biological and Medical Sciences	BBMRI	■	■	■	■	■
	EATRIS	■	■	■	■	
	ECRIN	■			■	■
	ELIXIR	■	■	■	■	■
	EMBRC		■	■		
	EU-OPENSCREEN		■	■		
	EURO-BIOIMAGING	■	■	■		
	ISBE					
	MIRRI					
	ANAEE		■			
	INFRAFRONTIER	■		■	■	
	INSTRUCT	■		■		
Materials and Analytical Facilities	EMFL					
	ESRF UPGRADE	■	■	■	■	
	EUROFEL (IRUVX-FEL)			■		
	ESSneutrons	■	■	■		■
	XFEL	■		■		
	ILL 20/20	■		■		
Physical Sciences and Engineering	CTA			■		
	E-ELT	■		■		
	ELI					
	FAIR			■	■	
	KM3NeT					
	SKA			■		
	SPIRAL2					
eInfrastructures	PRACE (ex HPC)	■	■	■	■	

Social Sciences and Humanities

			PREPARATORY PHASE Dec. 2011			IMPLEMENTATION PHASE Dec. 2011				
Project	Country code	RI Roadmap	OffiSial support letter	PartISipation level	Special funding allocated	PartISipation level	Funding agency MoU signed	Special funding allocated	Interest in national node	Funding for node allocated
CESSDA	DK	yes	yes	pp partner	no	pending	no	no	yes	no
	FI	yes	yes	pp partner	yes	partner	yes	no	yes	yes
	IS	no	no	no	no	no	no	no	no	no
	NO	yes	yes	pp partner	yes	host	yes	yes	yes	yes
	SE	yes	yes	pp partner	no	partner	yes	yes	yes	yes
CLARIN	DK	yes	yes	pp partner	yes	partner	yes	yes	yes	yes
	FI	yes	yes	pp partner	yes	pending	no	yes	no	no
	IS	yes	yes	pp partner	no	yes	pending	no	no	no
	NO	yes	yes	pp partner	yes	pending	yes	yes	yes	yes
	SE	yes	yes	no	no	no	no	no	yes	no
DARIAH	DK	yes	no	no	no	pending	no	no	yes	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	no	no	no	no	no	no	no	no	no
European Social Survey	DK	yes	no	data provider	yes	data provider	no	no	no	no
	FI	yes	yes	data provider	yes	pending	no	yes	no	no
	IS	yes	yes	pp partner	no	yes	yes	no	no	no
	NO	yes	yes	pp partner	no	pending	yes	yes	yes	yes
	SE	yes	yes	data provider	yes	data provider	yes	yes	yes	yes
SHARE	DK	yes	yes	partner	no	institutional	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	yes	no	yes	no	pending	no	no	yes	yes

Environmental Sciences

			PREPARATORY PHASE Dec. 2011			IMPLEMENTATION PHASE Dec. 2011				
Project	Country code	RI Roadmap	OffiSial support letter	PartISipation level	Special funding allocated	PartISipation level	Funding agency MoU signed	Special funding allocated	Interest in national node	Funding for node allocated
COPAL	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	inst. interest	no	user	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	no	no	no	no	no	no	no	no	no
EISCAT_3D	DK	no	no	inst. interest	no	no	no	no	no	no
	FI	no	yes	pp partner	no	member state	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	yes	yes	pp partner	yes	pending	no	yes	yes	yes
	SE	yes	yes	pp partner/host	yes	pending	no	no	no	no
EMSO	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	yes	pp partner	yes	no	no	no	no	no
	SE	yes	yes	pp partner	no	user	no	no	no	no
EPOS	DK	yes	yes	pp partner	no	no	no	no	no	no
	FI	no	no	no	in kind	user interest	no	in kind	no	no
	IS	yes	yes	pp partner	no	interest	pending	no	no	no
	NO	no	yes	pp partner	yes	interest	no	no	no	no
	SE	yes	yes	pp partner	no	user	no	no	yes	yes

Environmental Sciences

			PREPARATORY PHASE Dec. 2011			IMPLEMENTATION PHASE Dec. 2011				
Project	Country code	RI Roadmap	OffiSial support letter	PartISipation level	Special funding allocated	PartISipation level	Funding agency MoU signed	Special funding allocated	Interest in national node	Funding for node allocated
EURO ARGO	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	yes	pp partner	yes	no	no	no	no	no
	SE	no	no	no	no	no	no	no	no	no
IAGOS	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	no	no	no	no	no	no	no	no	no
ISOS	DK	yes	yes	pp partner	no	pending	no	no	yes	no
	FI	yes	yes	pp partner	yes	host candidate	yes	yes	yes	yes
	IS	no	no	no	no	no	no	no	no	no
	NO	no	yes	pp partner	yes	no	no	no	no	no
	SE	yes	yes	pp partner	yes	high interest	yes	yes	yes	yes
LIFEWATCH	DK	yes	yes	pp partner	no	pending	no	no	no	no
	FI	yes	yes	pp partner	in kind	inst. interest	MoU	in kind	no	no
	IS	no	no	no	no	interest	no	no	no	no
	NO	no	yes	pp partner	yes	no	no	no	no	no
	SE	yes	yes	pp partner	yes	high interest	MoI	in kind	yes	yes
SIOS	DK	no	no	inst. interest	no	no	no	no	no	no
	FI	no	no	inst. interst	no	user interest	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	yes	yes	pp partner	yes	host candidate	yes	yes	yes	yes
	SE	yes	yes	interest	no	yes	no	no	yes	no

Energy

			PREPARATORY PHASE Dec. 2011			IMPLEMENTATION PHASE Dec. 2011				
Project	Country code	RI Roadmap	OffiSial support letter	PartISipation level	Special funding allocated	PartISipation level	Funding agency MoU signed	Special funding allocated	Interest in national node	Funding for node allocated
ECCSEL	DK	no	no	inst. interest	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	yes	yes	pp partner	yes	host	yes	yes	yes	yes
	SE	no	no	no	no	no	no	no	no	no
HIPER	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	no	no	no	no	no	no	no	no	no
IFMIF	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	no	no	no	no	no	no	no	no	no
JHR	DK	no	no	no	no	no	no	no	no	no
	FI	yes	yes	in kind	no	in kind	inst. MoU	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	no	no	no	no	no	no	no	no	no
Windscanner	DK	yes	yes	lead	no	interest	no	no	yes	yes
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	yes	no	no	no	no	no	no	no
	SE	no	no	no	no	no	no	no	no	no
EU-SOLARIS	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	no	no	no	no	no	no	no	no	no
MYRRHA	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	yes	yes	pp partner	yes	no	no	no	no	no

Biological and Medical Sciences

			PREPARATORY PHASE Dec. 2011			IMPLEMENTATION PHASE Dec. 2011				
Project	Country code	RI Roadmap	Official support letter	Participation level	Special funding allocated	Participation level	Funding agency MoU signed	Special funding allocated	Interest in national node	Funding for node allocated
BBMRI	DK	yes	no	inst. interest	no	no	no	no	no	no
	FI	yes	yes	pp partner	yes	pending	no	yes	yes	yes
	IS	yes	yes	pp partner	no	interest	pending	no	?	?
	NO	yes	yes	pp partner	yes	interest	yes	yes	yes	yes
	SE	yes	yes	pp partner	yes	high interest	yes	yes	yes	yes
EATRIS	DK	yes	yes	pp partner	no	pending	no	no	yes	no
	FI	yes	yes	pp partner	yes	pending	no	yes	yes	yes
	IS	no	no	no	no	no	no	no	no	no
	NO	no	yes	pp partner	yes	no	interest	no	no	no
	SE	yes	yes	no	no	no	no	no	yes	no
ECRIN	DK	no	yes	institutional	no	inst. interest	no	no	no	no
	FI	no	no	pp partner	no	inst. interest	no	no	no	no
	IS	no	no	no	no	inst. interest	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	no	no	user	no	no	no	no	yes	no
ELIXIR	DK	yes	yes	pp partner	yes	yes	yes	yes	yes	yes
	FI	yes	yes	pp partner	yes	pending	no	yes	yes	yes
	IS	yes	yes	pp partner	no	interest	no	no	no	no
	NO	no	yes	pp partner	yes	no	no	no	no	no
	SE	yes	yes	pp partner	yes	high interest	yes	yes	yes	yes
EMBRC	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	yes	pp partner	yes	no	no	no	no	no
	SE	yes	yes	pp partner	no	no	no	no	yes	no

Biological and Medical Sciences

			PREPARATORY PHASE Dec. 2011			IMPLEMENTATION PHASE Dec. 2011				
Project	Country code	RI Roadmap	Official support letter	Participation level	Special funding allocated	Participation level	Funding agency MoU signed	Special funding allocated	Interest in national node	Funding for node allocated
EU-OPENSCREEN	DK	yes	no	inst. interest	no	no	no	no	no	no
	FI	no	no	inst. interest	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	yes	pp partner	yes	no	no	no	no	no
	SE	yes	yes	pp partner	yes	no	no	no	yes	yes
EURO-BIOIMAGING	DK	yes	yes	pp partner	no	no	no	no	yes	yes
	FI	no	yes	pp partner	no	inst. interest	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	yes	pp partner	yes	no	no	no	no	no
	SE	yes	yes	pp partner	yes	no	no	no	yes	yes
ISBE	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	yes	yes	pp partner	no	no	no	no	no	no
INFRAFRONTIER	DK	yes	no	pp partner	no	inst. interest	no	no	no	no
	FI	yes	yes	pp partner	in kind	inst. interest	no	yes	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	yes	yes	pp partner	yes	pending				
INSTRUCT	DK	yes	yes	pp partner	no	inst. interest	no	no	no	no
	FI	yes	yes	pp partner	in kind	inst. interest	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	yes	yes	pp partner	yes	inst. interest	no	no	yes	yes
ANAEEE	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	yes	no	no	no	no	no	no	no
	SE	yes	yes	pp partner	no	no	no	no	no	no
MIRRI	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	no	no	no	no	no	no	no	no	no

Materials and Analytical Facilities

			PREPARATORY PHASE Dec. 2011			IMPLEMENTATION PHASE Dec. 2011				
Project	Country code	RI Roadmap	Official support letter	Participation level	Special funding allocated	Participation level	Funding agency MoU signed	Special funding allocated	Interest in national node	Funding for node allocated
EUROFEL (IRUVX-FEL)	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	yes	yes	pp partner	no	no	no	no	no	no
EMFL	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	no	no	no	no	no	no	no	no	no
ESRF UPGRADE	DK	yes	yes	MS	no	MS	yes	yes	n/a	n/a
	FI	yes	no	MS	no	MS	no	no	n/a	n/a
	IS	no	no	no	no	no	no	no	n/a	n/a
	NO	yes	yes	MS	no	MS	yes	yes	n/a	n/a
	SE	yes	no	MS	no	MS	yes	yes	n/a	n/a
ESSneutrons	DK	yes	yes	co-host	yes	co-host	yes	yes	n/a	n/a
	FI	no	no	no	no	no	no	no	n/a	n/a
	IS	no	no	no	no	interest	no	no	n/a	n/a
	NO	yes	no	no	no	MS	yes	yes	n/a	n/a
	SE	yes	yes	host	yes	host	yes	yes	n/a	n/a
European XFEL	DK	yes	yes	pp partner	yes	MS	yes	yes	n/a	n/a
	FI	no	no	no	no	no	no	no	n/a	n/a
	IS	no	no	no	no	no	no	no	n/a	n/a
	NO	no	no	no	no	no	no	no	n/a	n/a
	SE	yes	no	pp partner	yes	MS	yes	yes	n/a	n/a
ILL 20/20	DK	yes	no	consortium	no	consortium	yes	no	n/a	n/a
	FI	no	no	no	no	no	no	no	n/a	n/a
	IS	no	no	no	no	no	no	no	n/a	n/a
	NO	no	no	no	no	no	no	no	n/a	n/a
	SE	yes	no	consortium	no	consortium	yes	no	n/a	n/a

Physical Sciences Engineering

			PREPARATORY PHASE Dec. 2011			IMPLEMENTATION PHASE Dec. 2011				
Project	Country code	RI Roadmap	Official support letter	Participation level	Special funding allocated	Participation level	Funding agency MoU signed	Special funding allocated	Interest in national node	Funding for node allocated
CTA	DK	no	no	inst. interest	no	no	no	no	no	no
	FI	no	no	pp partner	no	inst. interest	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	yes	yes	pp partner	no	no	no	no	no	no
E-ELT	DK	yes	no	MS	no	MS	no	no	no	no
	FI	yes	no	MS	no	MS	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	yes	no	MS	no	MS	no	no	n/a	n/a
ELI	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	no	no	no	no	no	no	no	no	no
FAIR	DK	no	no	no	no	no	no	no	no	no
	FI	yes	yes	pp partner	yes	member	agreement	yes	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	yes	yes	pp partner	yes	MS	yes	yes	n/a	n/a
KM3NeT	DK	no	no	inst. interest	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	no	no	no	no	no	no	no	no	no
SKA	DK	no	no	inst. interest	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	yes	no	pp partner	no	no	no	no	no	no
SPIRAL2	DK	no	no	no	no	no	no	no	no	no
	FI	no	no	no	no	no	no	no	no	no
	IS	no	no	no	no	no	no	no	no	no
	NO	no	no	no	no	no	no	no	no	no
	SE	no	no	no	no	no	no	no	no	no

eInfrastructures

			PREPARATORY PHASE Dec. 2011			IMPLEMENTATION PHASE Dec. 2011				
Project	Country code	RI Roadmap	Official support letter	Participation level	Special funding allocated	Participation level	Funding agency MoU signed	Special funding allocated	Interest in national node	Funding for node allocated
PRACE (ex HPC)	DK	yes	yes	no	no	partner	In progress	yes	no	no
	FI	yes	yes	pp partner	yes	interest	no	no	yes	yes
	IS	no	no	no	no	no	no	no	no	no
	NO	yes	yes	pp partner	yes	interest	yes	yes	yes	yes
	SE	yes	yes	pp partner	yes	partner	yes	yes	yes	yes