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NordForsk



Nordic R&D collaboration at EU level

NORDERA
ERA-NET Support Action
Report 2
Seville, September 2010



Preface

This report is a formal deliverable under Work Package 4 (Report on the ERA context) of the NORDERA project (Lessons Learnt from Nordic Coordination in the Context of ERA). NORDERA is an ERA-NET Support Action coordinated by NordForsk with the Nordic Innovation Centre (NICE) and the Joint Research Centre (JRC)/ Institute for Prospective Technological Studies (IPTS) in Seville as partners. By studying the Nordic region's experience with research and innovation cooperation, the NORDERA project supports ongoing coordination of national research programmes, thereby encouraging joint programming both in the Nordic region and in the European Union. While the first report studies the experiences in the Nordic region and seeks to identify good practices on research and innovation programme coordination, this report assesses how lessons learnt can be of value for the further development of both the European Research Area (ERA) and the Nordic Research and Innovation Area (NORIA) as an integral part of ERA. It has been written by Susana Elena-Perez at the Institute for Prospective Technological Studies of the European Commission's Joint Research Centre (JRC-IPTS).

The project has an Advisory Board, which consists of Annette Moth Wiklund, Swedish Research Council (Vetenskapsrådet); Inger Jonsson, Swedish Council for Working Life and Social Research (FAS); Ulf Westerlund and Hans Örjan Nohrstedt, Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas); Staffan Håkansson, VINNOVA; Satu Huuha-Cissokho, Academy of Finland; Raimo Pakkanen and Ari Ahonen, Finnish Funding Agency for Technology and Innovation (TEKES); Hans M. Borchgrevink and Sverre Sogge, Research Council of Norway; Soley Greta Sveinsdottir Morthens and Thorvald Finnbjörnsson, The Icelandic Centre for Research (RANNIS); Karin Dahl Jørgensen, The Danish Agency for Science, Technology and Innovation; Lise Jørstad, Nordic Energy Research (NEF); Dan Andree, Swedish Ministry of Education and Science; and Fredrik Melander, Nordic Council of Ministers.

I would like to thank the members of this Advisory Board for giving valuable feedback during the writing of this report. Special thanks go to the IPTS and Susana Elena-Perez for writing this report. We would also like to thank the European Commission for its financial support.

Oslo, 1 September



Gunnel Gustafsson, Director of Nordforsk

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Seville, 1 September,
Susana Elena Perez

Contents

TABLE OF CONTENTS

1.	Introduction	11
1.1.	Scope of the analysis	12
1.2.	Methodological approach	12
2.	Nordic participation in the ERA-NET scheme	15
2.1.	Country involvement in ERA-NETs	15
2.2.	Networks with intense Nordic participation and major fields of interest	25
2.3.	Nordic countries as network coordinators	30
2.4.	Nordic contribution to joint calls and funding modes	31
2.5.	Preliminary conclusions	34
3.	Nordic participation in Article 185 initiatives	38
3.1.	Ambient Assisted Living	38
3.2.	Eurostars	40
3.3.	European Metrology Research Programme	42
3.4.	BONUS-169 Joint Baltic Sea Research Programme	43
3.5.	Preliminary conclusions	44
4.	Nordic participation in Joint Programming Initiatives	46
4.1.	Agriculture, Food Security and Climate Change	47
4.2.	A Healthy Diet for a Healthy Life	49
4.3.	Preliminary conclusions	51
5.	Nordic participation in European Technology Platforms and related Joint Technology Initiatives	53
5.1.	Innovative Medicines Initiative (IMI)	54
5.2.	Embedded Computing Systems (ARTEMIS)	55
5.3.	The Fuel Cells and Hydrogen Initiative (FCH)	56
5.4.	Preliminary conclusions	58
6.	Concluding remarks	60
7.	References	63

LIST OF TABLES

Table 1.	Instruments analysed and source of information	13
Table 2.	FP6 ERA-NETs with intense Nordic participation	26
Table 3.	FP7 ERA-NETs with intense Nordic participation	29
Table 4.	Nordic contribution to joint calls launched by FP6 ERA-NETs	32
Table 5.	Contribution per cluster of countries to joint calls launched by FP6 ERA-NETs (%)	34

LIST OF FIGURES

Figure 1. Average participation in ERA-NETs by group of countries	15
Figure 2. MS and AC participation in FP6 ERA-NETs	16
Figure 3. MS and AC participation in FP7 ERA-NETs	17
Figure 4. GDP and participation in FP6 ERA-NETs by country	18
Figure 5. GDP and participation in FP7 ERA-NETs by country	18
Figure 6. Total population and participation in FP6 ERA-NETs by country	19
Figure 7. Total population and participation in FP7 ERA-NETs by country	19
Figure 8. Human resources in S&T and participation in FP6 ERA-NETs by country	20
Figure 9. Human resources in S&T and participation in FP7 ERA-NETs by country	20
Figure 10. Technological specialisation, Denmark (2005-2006)	22
Figure 11. Technological specialisation, Finland (2005-2006)	22
Figure 12. Technological specialisation, Norway (2005-2006)	23
Figure 13. Technological specialisation, Sweden (2005-2006)	23
Figure 14. R&D intensity and participation in FP6 ERA-NETs	24
Figure 15. R&D intensity and participation in FP7 ERA-NETs	24
Figure 16. Total number of FP6 ERA-NETs, ERA-NETs with intense Nordic participation, and total number of joint calls by thematic field	27
Figure 17. Cooperation of Nordic countries with other Nordic countries in F6 ERA-NETs	28
Figure 18. Total number of FP7 ERA-NETs, ERA-NETs with intense Nordic participation and total number of joint calls by thematic field	29
Figure 19. Cooperation of Nordic countries with other Nordic countries in F7 ERA-NETs	30
Figure 20. Coordination of FP7 ERA-NETs by country	31
Figure 21. Coordination of projects funded under the first AAL joint call and total funding of coordinated projects by group of countries	39
Figure 22. Coordination of positively evaluated proposals under the second AAL joint call	40
Figure 23. Projects approved under the first 3 Eurostars Cut-offs by groups of countries	41
Figure 24. Approved projects by country under the first 3 Eurostars Cut-offs (%)	42
Figure 25. Coordination of approved projects under the 2009 call by country	43
Figure 26. Number of projects coordinated and amount of funding granted by country	43
Figure 27. Specific support measures related to the JPI theme by participating country (2009)	47
Figure 28. Estimated available budget for specific and general national support measures related to the JPI by participating country (2009)	48
Figure 29. Number of specific support measures related to the JPI and estimated budget (2009) by participating country	50
Figure 30. 2009 Estimated budget of support measures by participating countries (%)	51
Figure 31. Coordination of projects funded under IMI 2008 joint call by funding source and country	54
Figure 32. Type of organisations involved in ARTEMIS by country	55
Figure 33. Total budget coordinated through projects (2008 call) by country	56
Figure 34. Type of organisations involved in the FCH by country	57
Figure 35. Coordination of projects funded under the FCH 2008 joint call by country (%)	57



Executive summary

This report has been prepared by the Institute for Prospective Technological Studies of the European Commission's Joint Research Centre (JRC-IPTS) as a formal deliverable under Work Package 4 (Report on the ERA context) of the NORDERA project (Lessons Learnt from Nordic Coordination in the Context of ERA).

By studying the Nordic region's experience with research and innovation (R&I) cooperation, NORDERA supports ongoing coordination of national research programmes, thereby encouraging joint programming both in the Nordic region and in the European Union.

Globalisation is increasing, and national and regional R&I systems cannot operate in a fully independent fashion. In this context, cross-border flows of knowledge are becoming more and more important, as is the need for countries to pool resources for R&I, particularly when attempting to tackle common socio-economic problems. Recognising this, Nordic countries have developed a significant number of common institutional structures, joint programmes and instruments. The Nordic region is one of the most extensive areas of cooperation in the world.

The first NORDERA report, entitled "Nordic R&I Cooperation: Achievements and Challenges", focused on transnational R&I collaboration in the Nordic region, both formalised and non-formalised. It argued that, during the past decade, R&I collaboration among the Nordic countries has evolved from a bottom-up process into one more characterised by top-down initiatives. The growing number of funding instruments for transnational R&D initiatives in the region, e.g. the various NORIA-Nets or Nordic Centres of Excellence, supports this claim.

The focus of the second report is on the scope and intensity of Nordic R&I collaboration in recent policy initiatives at European level involving public sector policy actors (e.g. ministries and funding agencies) at EU and national levels in the formulation of strategic R&D agendas.

The report analyses Nordic participation in the ERA-NET scheme, Article 169 projects (Article 185 of the Lisbon Treaty), Joint Programming Initiatives (JPIs), European Technology Platforms (ETPs) and related Joint Technology Initiatives (JTIs).

This analysis has encompassed a variety of indicators of participation selected according to the nature of the instrument and the data available. In particular, we have looked at the degree of participation and roles of participants in the networks as well as the funding invested in joint actions (e.g. joint calls). Since certain initiatives are at a very early stage (e.g. JPIs), estimated budgets of national research programmes in JPI-related areas have also been analysed.

Given the voluntary nature of the joint initiatives examined, these indicators have provided good insights into the political commitment of the Nordic countries and the potential of the Nordic region to contribute to joint R&D activities at European level.

The main results of the analysis can be summarised as follows:

- Nordic countries participate in the great majority of the joint initiatives analysed. In the ERA-NET scheme, on average, Nordic participation is slightly higher than the MS average and is similar to the Mediterranean countries. They participate in the four Article 185 projects and lead the initiative focused on the Baltic Sea, which is especially relevant for the development of the Nordic region. In three out of five JTIs, Nordic industry and public policy actors participate. Moreover, the estimated budgets of national research programmes show that Nordic countries have great potential for contributing to the JPIs, particularly in the fields of agriculture, food security and health and, thus, have a great capability for further integration. Overall, given their R&D capacities, the Nordic countries will potentially be able to play a leading role as a group of small but strong countries that can collectively remain ahead and become leaders of joint research actions at European level.
- The analysis of participation in the ERA-NETs in relation to other variables linked to the size of the nations in terms of GDP, total population and the human resources working in S&T indicated that small and large countries have distinct patterns of participation in joint R&D initiatives. Obviously, large countries have more resources and capacity at their disposal and thus their participation in joint R&D activities tends to be higher. In contrast, small countries with more limited capacity could be expected to concentrate their participation in areas of national strength. However, the data on specialisation for the Nordic countries suggests that specialisation is not the only factor underlying the participation pattern of the Nordic countries. The Nordic countries are highly specialised in certain fields of national interest, but at the same time they participate in a broader range of networks that are not directly linked to their areas of expertise. This is particularly true for Finland and Sweden. A plausible explanation is that these countries are exploring new areas by joining a large number of international networks and that their internationalisation strategies are based on the principle of “observe and learn”.
- Looking at R&D intensity we observed that there is, in general, a positive correlation between this variable and participation in international networks. Regardless of their size, the vast majority of European countries follow the same trend. However, data on R&D intensity reveals that, as a group, the Nordic countries (with the exception of Norway) present a distinct pattern that is different from the rest of the European nations, with lower than expected levels of participation for countries with such high R&D intensities. In general terms, the long history of cooperation in R&D and innovation in the Nordic region may partially explain this, with participation in Nordic schemes ‘competing’ with participation in European schemes, but it is difficult to conclude from this analysis that existing Nordic R&I cooperation is a substitute for, rather than a supplement to, collaboration at a wider level.
- Although the analysis has revealed certain fields that appear to be of common interest throughout the Nordic region, the individual countries have different approaches to participation at the European level stemming from different national strategies and technological profiles. Thus, it cannot be argued that a joint Nordic strategy actually exists. The distinct specialisation profile of the individual countries as well as their different behaviours in joining networks indicated different participation patterns. Finland has the most intense presence of all of the Nordic countries in all of the instruments analysed. It appears to have a more proactive strategy for international R&D collaboration at European level than the other Nordic countries, and it has taken on leadership roles in fields of national strategic interest (e.g. area of well-being under the AAL initiative, where Finland is one of the largest contributors). Sweden appears to have adopted more of a hybrid approach. While it participates in a large number of initiatives, it does not play a strong role as coordinator of the joint initiatives. Its strategy seems to be based more on observing and learning. Denmark and Norway play a more modest role, with medium participation rates and almost no presence as coordinators. However, both countries show great potential for contributing to, and even leading, the JPIs in the fields of agriculture, food security and health. Finally, as expected given its small

size and population, Iceland has the lowest degree of involvement and generally participates in initiatives in which the other four Nordic countries participate.

- In terms of the actors involved, the Nordic countries participate in EU instruments almost exclusively through national funding agencies. National programme owners (e.g. ministries) are not partners in international networks. The most active organisations are: the Danish Agency for Science, Technology and Innovation (Denmark), VINNOVA (Sweden), the Research Council of Norway, and Tekes (Finland). These funding agencies generally play a very moderate role in terms of serving as coordinators of joint projects and networks.
- The Nordic region through its Nordic cross-border institutions was only involved in a small number of initiatives (mainly ERA-NETs). As argued in the first NORDERA report, the Nordic institutional landscape is rather complex and there is little cooperation between the existing bodies of Nordic cooperation. The fragmented institutional structure and complexity of the system may explain the limited presence of Nordic institutions in European networks. In our view, the increased involvement of Nordic organisations could be a means of strengthening “Nordic added value” in areas that are strategically important to the Nordic countries and of integrating the Nordic dimension into the strategic level of European policy. This could also be a way of drawing attention to the Nordic region as an attractive international partner.
- The willingness to allow national funding to cross national borders may be perceived as a strong indicator of support for the development of the ERA. However, data on FP6 ERA-NETs showed that the great majority of joint calls employed the virtual pot model and that the (real) common pot model was used in approximately 5% of the cases. In this respect, it is interesting to note that the Nordic countries on average allocated a higher proportion of funding via a real common pot than the Mediterranean countries and large countries. Furthermore, the analysis indicated that a real common pot was more frequently used in networks with intense Nordic participation than in networks with no Nordic participation. This may suggest that the Nordic countries have the capacity to influence funding-related decision-making processes, to a greater or lesser degree.
- Implementing common pot or similar funding agreements in Europe will be contingent on overcoming legal and administrative barriers at the national level and building mutual trust between funding agencies. Although this will be difficult, it is not impossible. The value of the Nordic countries’ experience with common pot agreements for an array of projects and co-funded initiatives should be afforded greater recognition.
- Successful examples in the Nordic region, such as the Top-level Research Initiative (TRI), can serve to encourage a move towards the use of real common pots at EU level. The TRI initiative provides support for cross-border communities, allocating funding on the basis of competence and excellence rather than national affiliation. The development of the TRI sub-programmes has inspired the Nordic countries to adapt their research programme portfolios to a certain degree – demonstrating that schemes using the real common pot model have the power to influence national research priorities.



1. Introduction

Globalisation is increasing, and national and regional research and innovation (R&I) systems cannot operate in a fully independent fashion. In this context, cross-border flows of knowledge are becoming more and more important, as is the need for countries to pool resources for R&I, particularly when attempting to tackle common socio-economic problems. Recognising this, the Nordic countries have developed a significant number of common institutional structures, joint programmes and instruments, making the Nordic region one of the most extensive areas of cooperation in the world.

By studying the Nordic region's experience with R&I cooperation, the NORDERA project supports ongoing coordination of national research programmes, thereby encouraging joint programming both in the Nordic region and in the European Union (EU).

The first NORDERA report, entitled "Nordic R&I Cooperation: Achievements and Challenges"¹, was the culmination of a comprehensive effort to map Nordic R&I collaboration initiatives. It presented a clear and informative overview of the most important transnational initiatives in the region, both formalised and non-formalised. It argued that, during the past decade, R&I collaboration among the Nordic countries has evolved from a bottom-up process into one more characterised by top-down initiatives. The growing number of funding instruments for transnational R&D projects in the region, e.g. the various NORIA-Nets and Nordic Centres of Excellence, support this claim.

Launched in 2004, the NORIA concept represents the most recent step to strengthen the Nordic R&I system. Inspired by the ERA concept, one of the main pillars of the NORIA concept is cross-border R&D collaboration. This has led to the establishment of new institutions (e.g. the Nordic Innovation Centre and NordForsk).

Today Nordic R&I cooperation is characterised by institutional complexity and a growing number of instruments and initiatives inspired by common-pot agreements (no "juste retour"). Mutual trust and recognition, as well a common identity, are key components of collaboration between the Nordic countries at both the strategic level and with regard to implementation.

As argued in the aforementioned report, the structures and processes in place for coordinating research programmes in the Nordic region, and the Nordic countries' experience with formulating and implementing joint programmes, constitute rich sources of knowledge that may be of value for the realisation of the European Research Area (ERA) and the future of the Joint Programming (JP) process.

Recognising the importance of extending their R&I collaboration strategy beyond their own region, the Nordic countries are also partners in EU initiatives and joint activities. Consequently, our aim is to supplement the analysis presented in the previous NORDERA report by analysing the scope and intensity of Nordic involvement in a range of EU-level collaboration initiatives.

¹ Available at <http://www.nordera.org/>

This report addresses the following key questions:

- How can Nordic R&D collaboration be characterised in terms of scope and intensity of collaboration at EU level?
- What issues are raised by this analysis that are of relevance to the Joint Programming process?

1.1. SCOPE OF THE ANALYSIS

Many policies and instruments have been implemented since the ERA concept was first endorsed in 2000 as part of the drive to promote transnational R&D collaboration, channel knowledge flows and pool resources on a multinational basis.

The focus of this report is on recent policy initiatives at the European level that involve public sector policy actors (e.g. ministries and funding agencies) at the EU and national levels in the formulation of strategic R&D agendas and the implementation of new, cross-border instruments to support both public and private R&D performers. Our analysis therefore excludes initiatives such as the EU Framework Programme (FP)², COST, EUREKA, etc.

The report analyses Nordic participation in the following instruments: the ERA-NET scheme, Article 169 projects (now Article 185 of the Lisbon Treaty)³, Joint Programming Initiatives (JPIs) and European Technology Platforms (ETPs)⁴.

“Nordic participation” in these initiatives is defined as the participation of at least three Nordic countries. This is in line with the criteria set out by NordForsk – one of the main cooperative bodies under the umbrella of the Nordic Council of Ministers⁵ – for allocating funding to Nordic research projects.

1.2. METHODOLOGICAL APPROACH

There are different ways of looking at the level of involvement or participation of countries and regions in cross-border initiatives, and these may vary from scheme to scheme.

For the purpose of this report, we attempt to measure the scope and intensity of Nordic participation in the above-mentioned EU instruments using various indicators of participation depending on the nature of the initiative and the data available.

In particular, we look at:

- Net participation of individual countries in each instrument – and in the different networks or projects developed through them – as well as aggregate participation of Nordic countries vis-à-vis other relevant clusters of countries (e.g. Mediterranean countries⁶ or large countries).

² For analysis of Nordic countries’ participation in the Framework Programme (FP), see Tekes (2008); Danish Agency for Science Technology and Innovation (2010); Arnold et al. (2008); Godo et al. (2009). There is also an ongoing project headed by Technopolis and NIFU STEP to better understand how the FP works and how to optimise the national participation of the Nordic countries.

³ Article 169 of the EC Treaty enables the Community to participate in research programmes undertaken jointly by several Member States, including participation in the structures created for the execution of national programmes. Article 169 became Article 185 of the Lisbon Treaty. Therefore, we will hereafter refer to Article 185 of the Lisbon Treaty.

⁴ Particularly those which have become Joint Technology Platforms (JTIs) (see Section 5).

⁵ For more details see NORDERA Report No. 1 (pp. 14-15).

⁶ The group “Mediterranean countries” includes at least three of the following four countries: Portugal, Spain, Italy and Greece. The group “large countries” includes UK, France and Germany.

- The relationship between participation in R&D collaboration initiatives and other variables related to the R&D capacity of the countries (e.g. GDP, total population, size of the science and technology sector and R&D intensity).
- The type (e.g. programme managers, programmes owners, international organisations, industry, universities and research organisations) and role of the institutions involved. The “centrality” of the participating countries, i.e. the importance of their role within the network, will be estimated by analysing which institutions serve as network and project coordinators. This will also provide insight into the interest of the participants in taking on a leadership role rather than simply observing and learning.
- The amount of funding invested in the development of joint activities at EU level. A common assumption is that the strongest signal of political interest is the commitment of funding. This is particularly crucial in the context of this report, given the voluntary nature of the instruments. Thus, we analyse the contribution of individual countries and clusters of countries to the joint actions associated with each instrument (e.g. joint calls and joint programmes), paying special attention to the research fields they cover. Due to the fact that certain initiatives, such as the JPIs, have only recently been operationalised, data on the funding committed are not yet available. Thus, the capacity to contribute to the joint undertakings is estimated by analysing the available budget in specific national R&D programmes.

In terms of data sources, this report draws upon an array of studies, reports and data repositories. Table 1 presents an outline of each instrument analysed and the corresponding source of data.

TABLE 1. INSTRUMENTS ANALYSED AND SOURCE OF INFORMATION

Instrument	Networks analysed	Source of data
ERA-NET scheme	• ERA-NETs under 6th Framework Programme (FP6)	Matrix and Ramboll study and data base (European Commission, 2009a)
	• ERA-NETs under 7th Framework Programme (FP7)	NETWATCH Information Platform
Article 185 (prev. Art. 169)	Initiatives under FP7:	CORDIS (2010) and reports and websites for each initiative
	• Ambient Assisted Living (AAL)	
	• Eurostars	
	• European Metrology Research Programme (EMRP)	
	• BONUS-169	
Joint Programming Initiatives (JPIs)	• Agriculture, Food Security and Climate Change	ERAWATCH Research Inventory and European Commission reports and website
	• A Healthy Diet for a Healthy Life	
European Technology Platforms (ETPs)	• Innovative Medicines Initiative (IMI)	CORDIS (2010) and reports and websites for each initiative
	• Embedded Computing Systems (ARTEMIS)	
	• Fuel Cells and Hydrogen Initiative (FCH)	

The remainder of the report is structured as follows; Sections 2 through 5 analyse Nordic participation in the above-mentioned instruments: the ERA-NET scheme, Article 185 (previously Article 169) projects, JPIs and ETPs. The final section (Section 6) summarises the conclusions and main issues raised by the analysis which may be of relevance to the further development of the ERA.



2. Nordic participation in the ERA-NET scheme

2.1. COUNTRY INVOLVEMENT IN ERA-NETS

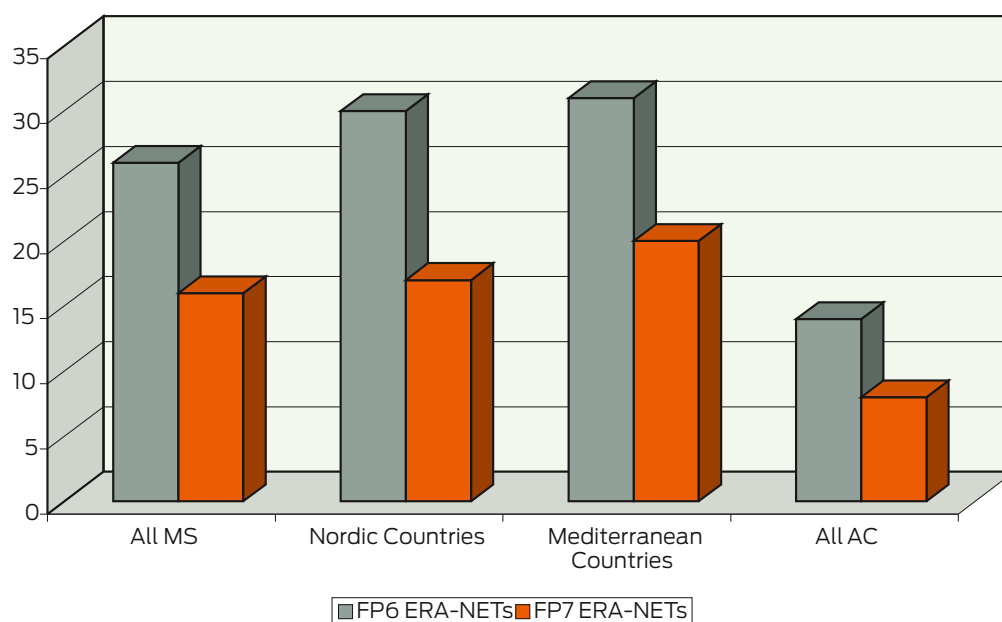
There is growing consensus that the ERA-NET scheme is a useful instrument in catalysing cooperation between national and regional R&D programmes across Europe.

The scheme is helping to make the ERA a reality by improving the coherence and coordination of European research programmes and enabling national systems to take on tasks collectively that they would not have been able to deal with independently.

Seventy-one ERA-NETs were funded under the 6th Framework programme (FP6) and about 40 are currently running under the 7th Framework Programme (FP7). At present, the scheme involves 51 countries (including Member States (MS), Associated Countries (AC) and Third Countries), which represents an increase of around 27% compared to 2008. All MS and nearly all AC⁷ are participating in the active ERA-NETs.

On average, the participation of the Nordic countries in ERA-NETs under both FP6 and FP7 is slightly higher than the participation of all MS and is similar to the participation of the Mediterranean countries⁸ (see Figure 1).

FIGURE 1. AVERAGE PARTICIPATION IN ERA-NETS BY GROUP OF COUNTRIES



Source: Based on NETWATCH Information Platform and European Commission (2009a)

⁷ All AC except Liechtenstein and Serbia.

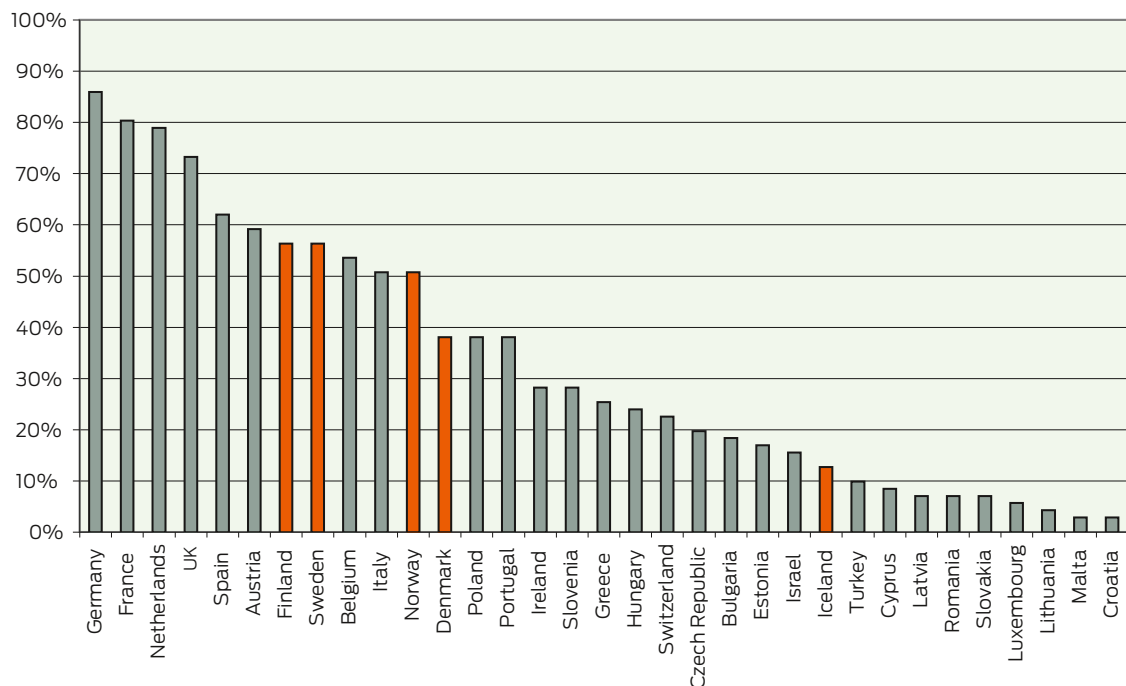
⁸ Portugal, Spain, Italy and Greece.

At country level, two MS – Germany and France – were the leading participants in the ERA-NETs under FP6 and have maintained their high rate of participation in active FP7 ERA-NETs (see Figures 2 and 3).

In the Nordic region, Finland and Sweden have had the highest participation rates in both FP6 and FP7 ERA-NETs, followed by Denmark and Norway. Iceland has had the lowest rate.

Comparing FP6 and FP7 data, we observed that while Finland and Iceland's level of participation has increased (by about 10 percentage points), Sweden and Norway's has decreased. Denmark's participation has been stable, with involvement in approximately 35% of the networks.

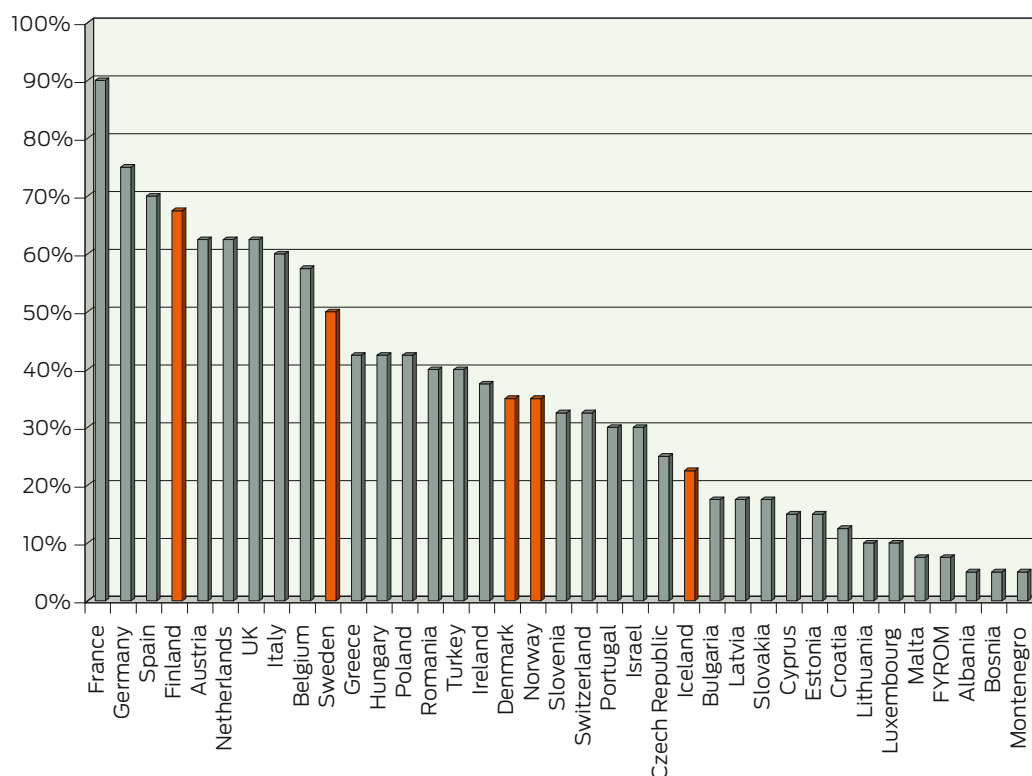
FIGURE 2. MS AND AC PARTICIPATION IN FP6⁹ ERA-NETs



Source: Based on European Commission (2009a)

⁹ Total of 71 FP6 ERA-NETs.

FIGURE 3. MS AND AC PARTICIPATION IN FP7¹⁰ ERA-NETS



Source: Based on NETWATCH Information Platform

In addition to looking at net participation, it is interesting to analyse the relationship between the individual country's involvement in a particular scheme and other variables related to the country's capacity to engage in transnational R&D collaboration activities. It may be argued that when countries have more resources and capacity at their disposal they can be expected to participate in such R&D activities more extensively.

The ranking of countries in Figures 2 and 3 above suggests that, in principle, larger countries participate in a greater number of networks. Hence, the size of a country appears to be a relevant factor in determining its potential to collaborate at international level. The figures below illustrate the relationship between the individual country's participation in FP6 and FP7 ERA-NETs and a number of variables linked to the size of the country and the size of the Science and Technology (S&T) sector, specifically: GDP, total population and total human resources within the S&T sector¹¹. In the figures below, averages for the period 2002-2006 have been used for FP6 ERA-NETs, while averages for the period 2007-2008 have been used for networks launched under FP7.

GDP is a widely accepted indicator of a country's overall economic output. Figures 4 and 5 clearly show two different groups of countries with different behaviours. One corresponds to the large countries (Germany, France, UK, Spain and Italy) and the other corresponds to the smaller countries. Two regression lines have been traced in each graph to better visualise these trends (the blue line represents the large countries and the red line the smaller countries).

All of the Nordic countries are grouped together with the cluster of smaller countries. Interestingly, Finland stands out, with a significantly higher level of participation despite a much lower GDP than the large countries.

The same participation behaviour is demonstrated in FP6 and FP7 ERA-NETs.

¹⁰ Total of 40 ERA-NETs, including ERA-NET Plus actions.

¹¹ Source of data for GDP, total population and total human resources within the S&T sector: Eurostat.

FIGURE 4. GDP AND PARTICIPATION IN FP6 ERA-NETS BY COUNTRY

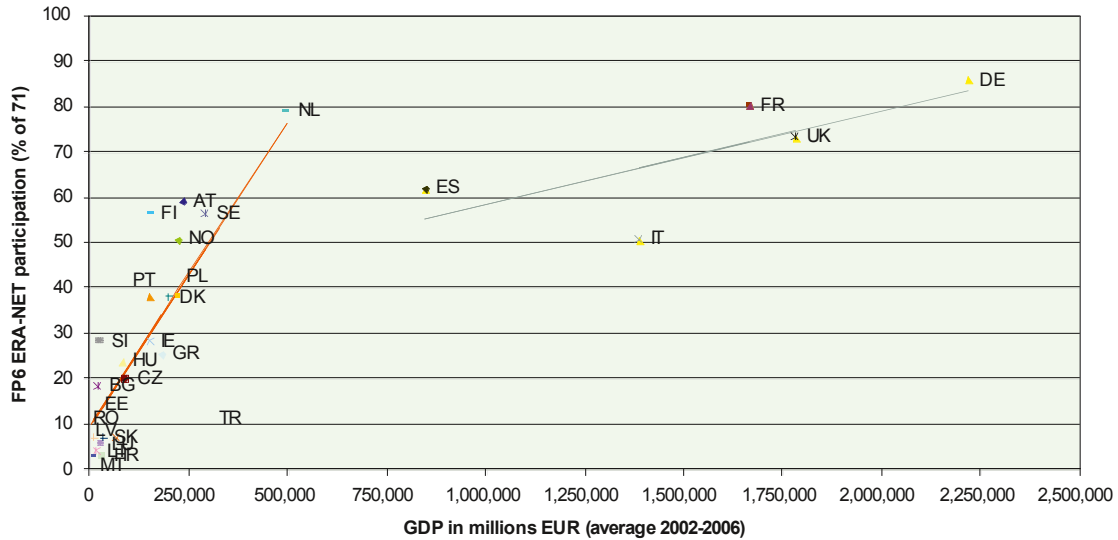
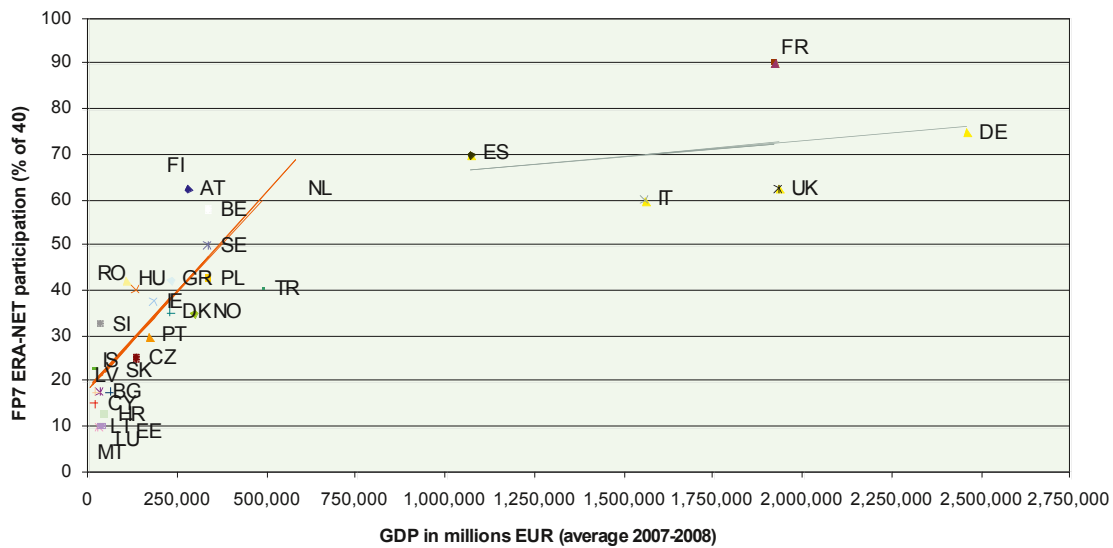


FIGURE 5. GDP AND PARTICIPATION IN FP7 ERA-NETS BY COUNTRY



Looking at the total population of the participating countries (see Figures 6 and 7), the picture is quite similar to the one presented in the previous figures. Again, two groups of countries are clearly identifiable: a group of large countries (this time including also Poland) and a group of smaller countries. The graphs also show that for both FP6 and FP7, the red line (which corresponds to the regression¹² of the position of the smaller countries) is above the blue line (which corresponds to the regression of the position of the larger countries). This implies that the cluster of smaller countries is making a significant effort to join R&D networks despite their smaller populations. Among the Nordic countries, Finland, Sweden and Norway present similar behaviours with regard to participation in FP7 ERA-NETs. As mentioned above, Finland stands out among the Nordic countries in the period 2002-2006, with the highest participation rate in ERA-NETs.

¹² Although the positions of Turkey and Romania are shown in the graphs, they were not included in the regression line.

FIGURE 6. TOTAL POPULATION AND PARTICIPATION IN FP6 ERA-NETS BY COUNTRY

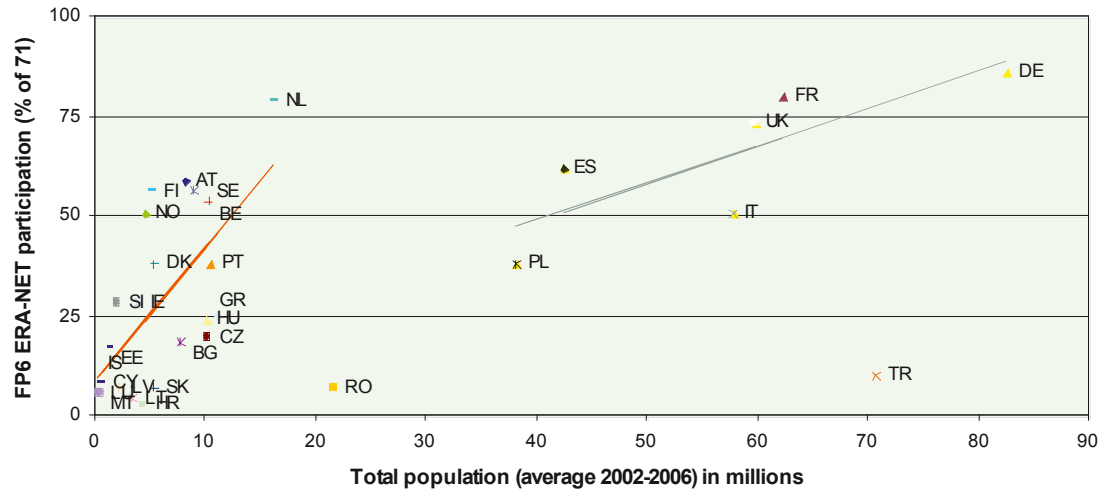
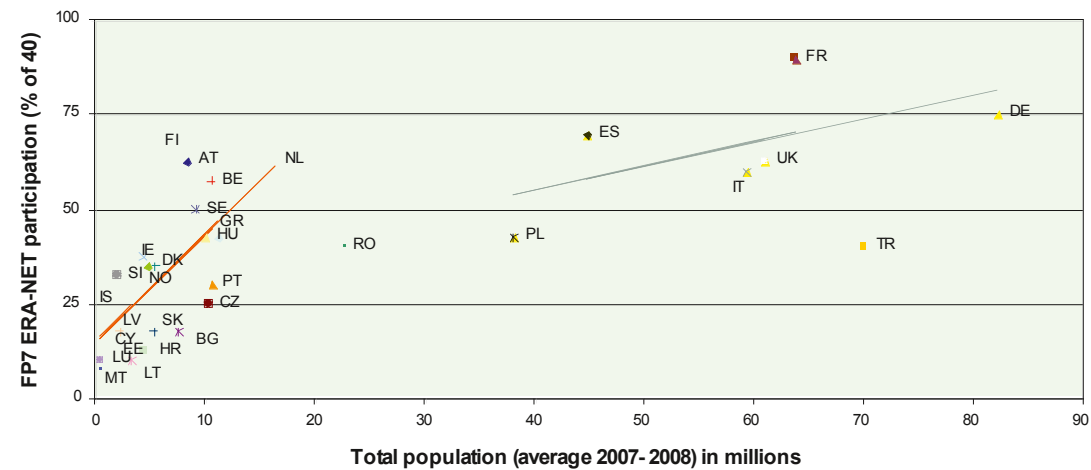


FIGURE 7. TOTAL POPULATION AND PARTICIPATION IN FP7 ERA-NETS BY COUNTRY



It is also interesting to look at the size of the S&T sector of the participating countries. This has been measured using the total number of human resources working in the S&T sector (HRSTC) as a proxy. Specialised manpower is one of most important resources a nation possesses and is an important factor when examining its capacity to collaborate on joint R&D initiatives.

Once again, size appears to be a relevant factor for differentiating between the participation patterns of large¹³ and smaller countries in Europe. Among the Nordic countries, Finland has the highest position when it comes to participation in FP6 ERA-NETs (see Figure 8). For FP7, Finland, Sweden and Norway have similar positions (see Figure 9).

13 Germany, France, UK, Spain, Italy and Poland.

FIGURE 8. HUMAN RESOURCES IN S&T AND PARTICIPATION IN FP6 ERA-NETS BY COUNTRY

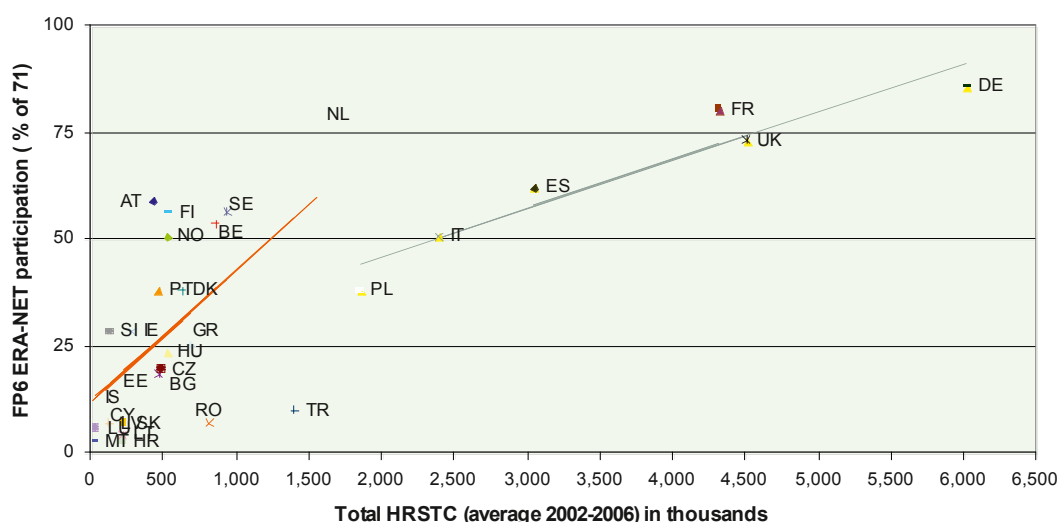
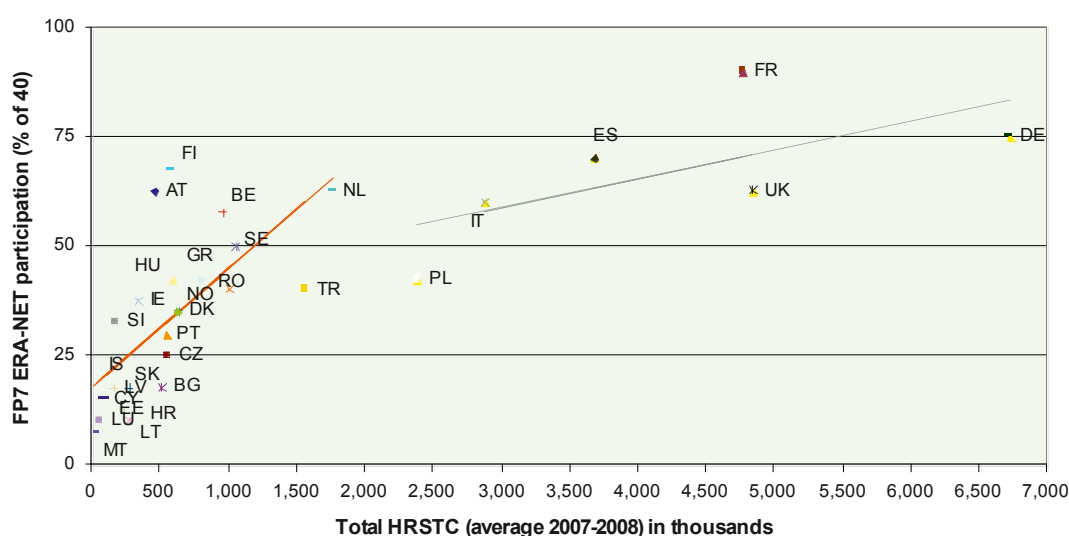


FIGURE 9. HUMAN RESOURCES IN S&T AND PARTICIPATION IN FP7 ERA-NETS BY COUNTRY



To better understand countries' participation patterns in international R&D networks, their economic structure and fields of specialisation must be taken into consideration along with their size. On the one hand, large countries with large populations and larger S&T systems (e.g. Germany and France) have greater potential for investing in a variety of fields and are thus in a position to cultivate a more diversified scientific and technological profile, which could explain why these countries have a higher level of participation in the schemes. On the other hand, small countries with more limited capacity may choose to concentrate investment in priority fields of national interest, in which they may potentially become stronger than their international peers. This is certainly the case of the Nordic countries.

In one of the most recent works measuring S&T specialisation¹⁴, "relative technological specialisation" is defined as the technological performance of a country in a specific technology field relative to its overall international technological performance.

The Revealed Comparative Advantage (RCA) introduced by Balassa (1965) is used as a parameter to determine publication and patent specialisation (European Commission, 2009c). This specialisation index is centred on zero and stays within a range of +100 to -100. Positive values for a field indicate

¹⁴ European Commission (2009c).

that the field has a higher weight in the portfolio of the country than could be expected, taking into consideration the other countries, e.g. the EU27. Negative values indicate that specialisation is below the average for that particular country.

To provide a snapshot of the technical profile of the Nordic countries, the figures below (covering the period 2005-2006¹⁵) illustrate whether the countries are positively or negatively specialised in a given technology field in comparison to the average of the EU27 (see Figures 10, 11, 12 and 13 for Denmark, Finland, Norway and Sweden, respectively). The radar graphs show the fields in which the countries hold a strong position, and reveal the differences between the Nordic countries with regard to their technological profile.

Denmark is less specialised in medium-technology fields such as “transport”, “machine tools”, “electronic components” and “computers, office machines”. Its strongest specialisation is in “medical equipment” and “textiles, wood, paper, future, food” (see Figure 10).

Finland is strongly specialised in high-technology fields such as “telecommunications” and “electronics” and in medium-technology fields such as “computers, office machines”, while it is below the EU27 average in the remaining fields (see Figure 11).

Norway is above the EU27 average in the fields related to “textiles, wood, paper, furniture and food” as well as in “special and general machinery” and “basic chemicals”. It is less specialised in high-technology fields such as “electronics” and “telecommunications” (see Figure 12).

Finally, Sweden is mainly specialised in high-technology fields such as “telecommunications” and “medical equipment”, with lower than average specialisation in “basic chemicals” and “textiles, wood, paper, furniture and food” (see Figure 13).

Although they have clear areas of specialisation, the Nordic countries participate in a significant number of ERA-NETs outside of their fields of national strength. Specialisation does not appear to be the main driver for participation in international R&D initiatives. This is particularly true for Finland and Sweden, which have joined a large number of networks that are not always directly linked to fields in which they can take on a leadership role. This appears to be a result of a strategy for internationalising R&D based on exploring new fields and research areas and on the principle of “observe and learn”.

¹⁵ Iceland is not represented because of its small size. This implies a lack of observations at the disaggregation level used to construct the specialisation index.

FIGURE 10. TECHNOLOGICAL SPECIALISATION, DENMARK (2005-2006)

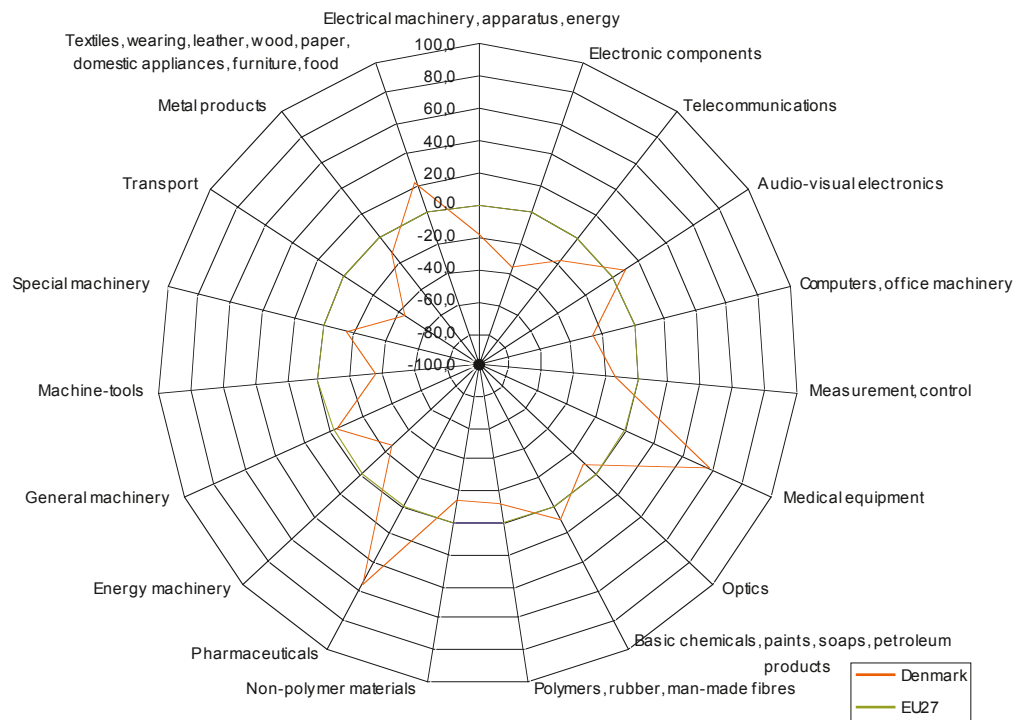


FIGURE 11. TECHNOLOGICAL SPECIALISATION, FINLAND (2005-2006)

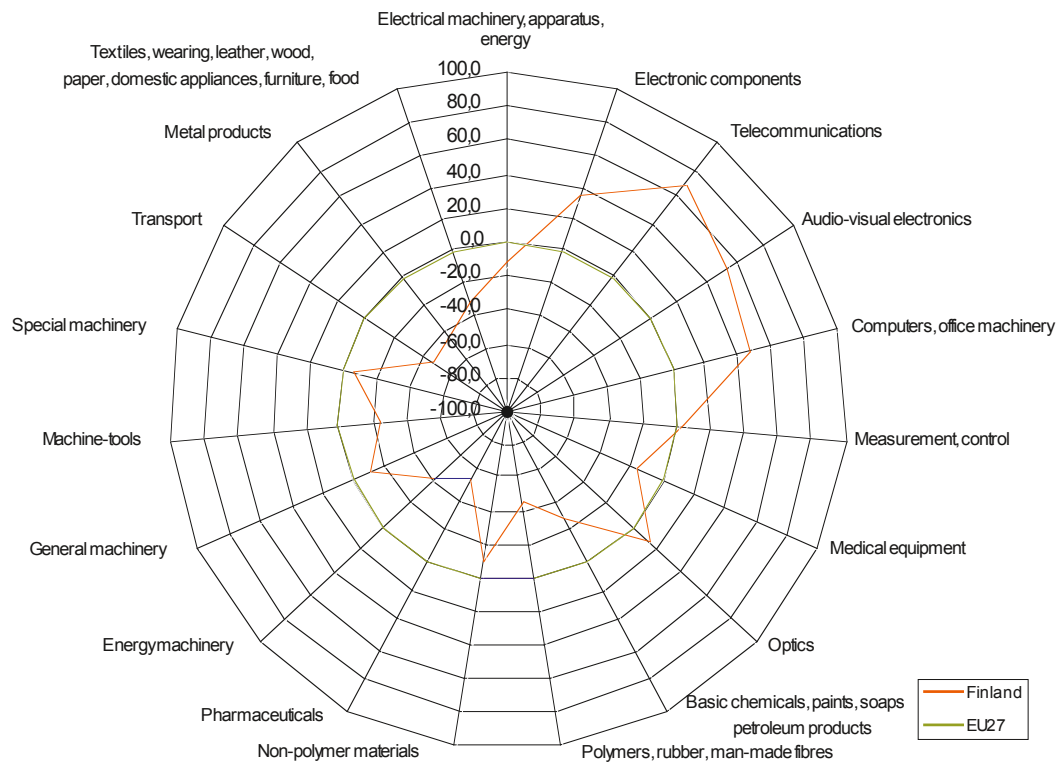


FIGURE 12. TECHNOLOGICAL SPECIALISATION, NORWAY (2005-2006)

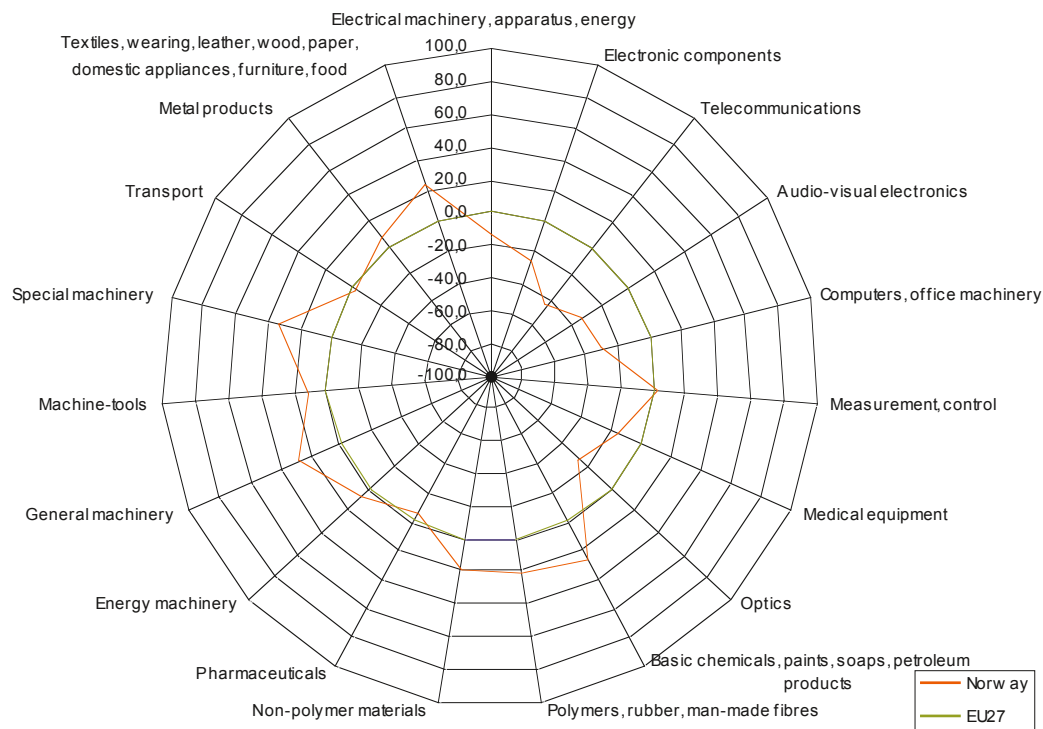
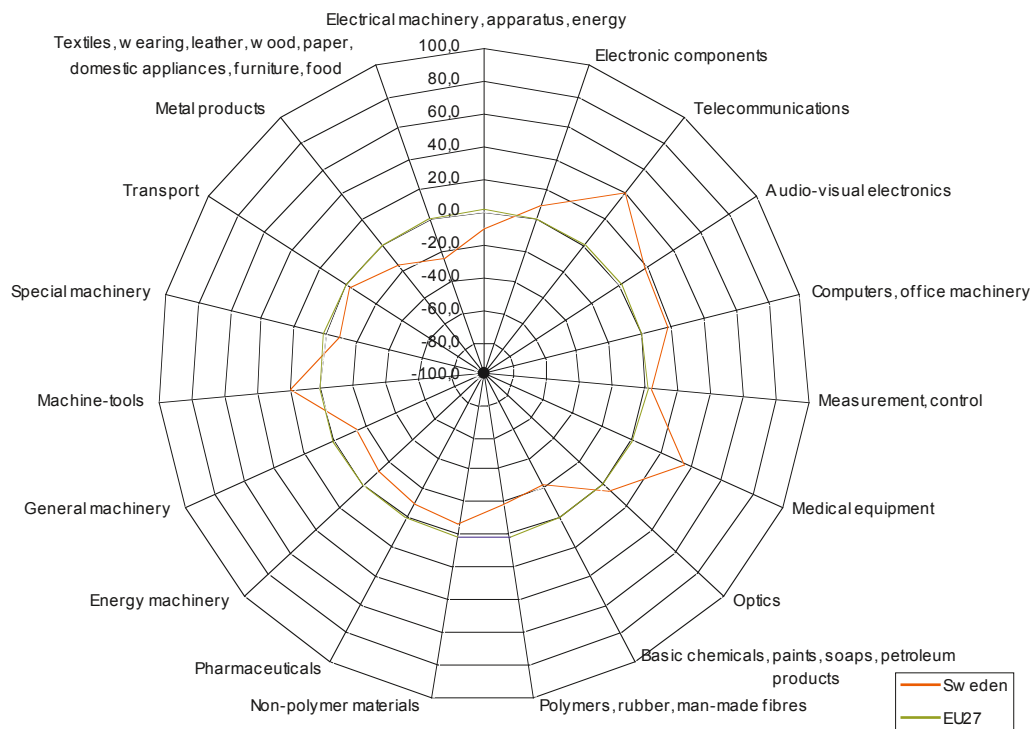


FIGURE 13. TECHNOLOGICAL SPECIALISATION, SWEDEN (2005-2006)



Looking at R&D intensity¹⁶ we observed that there is, in general, a positive correlation between this variable and participation in ERA-NETs (see Figure 14 for FP6 networks and Figure 15 for FP7 networks).

Regardless of their size, the vast majority of European countries exhibit the same trend. However, while the Nordic countries have some of the highest R&D intensity rates in Europe they have lower participation rates in the ERA-NET scheme than one might expect given the slope of the regression line for all the other countries. As shown in Figures 14 and 15, the trend line of these countries¹⁷ (the blue line) lies above the regression line of the rest of European countries (the red line). The only exception is Norway, which has participation rates in line with its R&D intensity.

The picture is similar for ERA-NETs under both FP6 and FP7.

FIGURE 14. R&D INTENSITY AND PARTICIPATION IN FP6 ERA-NETs

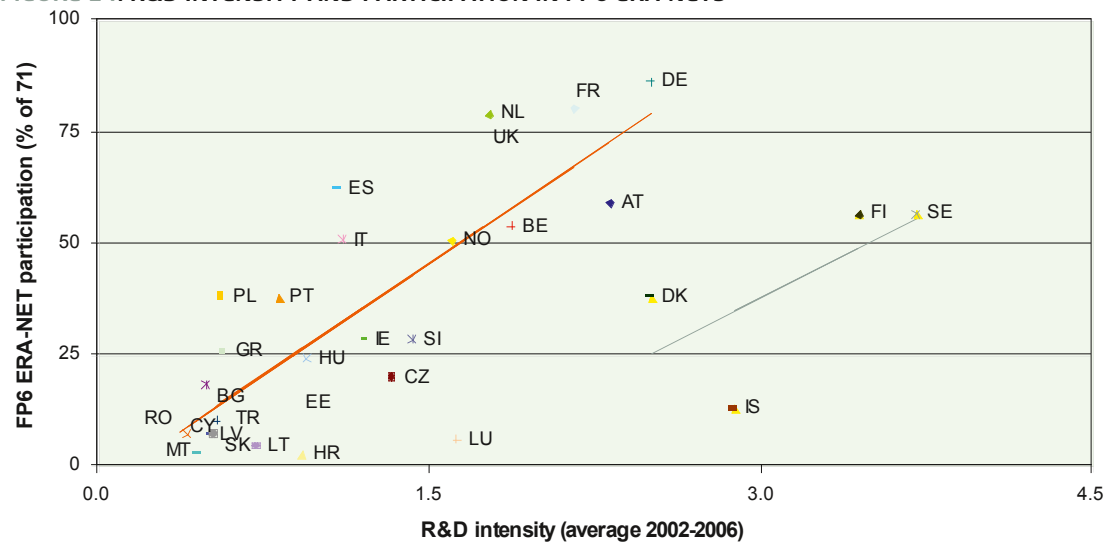
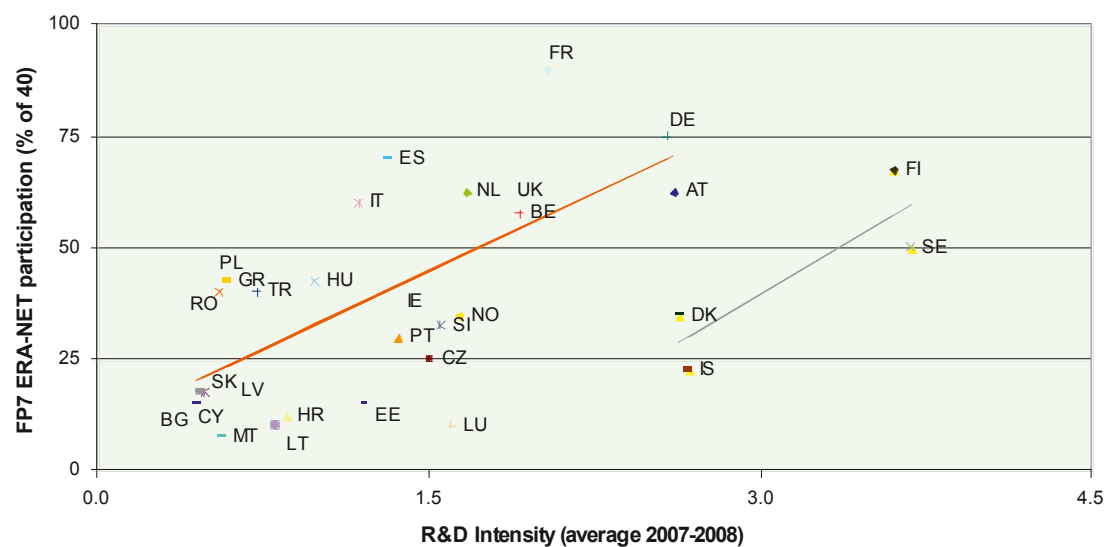


FIGURE 15. R&D INTENSITY AND PARTICIPATION IN FP7 ERA-NETs



¹⁶ R&D intensity is defined as the R&D expenditure as a percentage of GDP. All sectors included. Source: Eurostat.

¹⁷ Finland, Sweden, Denmark and Iceland.

There is no doubt that size has some influence on a country's capacity to participate in international networks and joint initiatives. However, data on R&D intensity reveal that the Nordic countries (with the exception of Norway) form a group with a distinct pattern of participation that differs from the rest of the European nations.

The region's long history of cooperation in R&D and innovation and the existence of joint institutional structures (e.g. NordForsk and the Nordic Innovation Centre) and joint programmes (e.g. the Top-level Research Initiative) in the Nordic region may partially explain the pattern of participation in European initiatives, with participation in Nordic schemes 'competing' with participation in European schemes. In the case of the ERA-NET scheme, for example, the creation of NORIA-net¹⁸, a new Nordic instrument, could affect the Nordic countries' participation in ERA-NETs. It is difficult to conclude from this analysis, however, that existing Nordic R&I cooperation is a substitute for, rather than a supplement to, collaboration at a wider level.

2.2 Networks with intense Nordic participation and major fields of interest

From an aggregate perspective, we have analysed the ERA-NETs in which more than one Nordic country participates. In FP6 ERA-NETs, we found 27 networks with intense Nordic participation (i.e. the participation of three or more Nordic countries), which represents almost 40% of the total networks. Table 2 presents the networks and fields of interest to the individual Nordic countries.

¹⁸ Launched by NordForsk in 2007, this coordination programme is modelled on the ERA-NET scheme. Its aim is to encourage collaboration between the Nordic countries as well as the Baltic countries and North-Western Russia. As expected, Finland and Sweden have participated most actively in the initiative. Of the 11 NORIA-nets developed so far, five are coordinated by Sweden and four by Finland, which represents more than 80% of the total projects. Denmark and Norway only coordinate one network each, while Iceland has not yet taken on a coordinating role. For more detailed information, see NORDERA Report No. 1 (p. 15).

TABLE 2. FP6 ERA-NETS WITH INTENSE NORDIC PARTICIPATION

Name of ERA-NET	Thematic Field	DK	FI	SE	NO	IC	Total no. of Nordic countries
EraSME	Industrial Technologies and SMEs	X	X	X	X	X	5
HERA	Social Sciences and Humanities	X	X	X	X	X	5
HY-CO	Energy	X	X	X	X	X	5
NORFACE	Social Sciences and Humanities	X	X	X	X	X	5
SAFEFOODERA	Life Sciences	X	X	X	X	X	5
CORE Organic	Life Sciences	X	X	X	X		4
ECORD	Environment	X		X	X	X	4
ERA-NET TRANSPORT	Transport	X	X	X	X		4
ERA-PG	Life Sciences	X	X	X	X		4
EUROPOLAR	Environment	X	X	X	X		4
ForSociety	Social Sciences and Humanities	X	X	X	X		4
iMERA	Industrial Technologies and SMEs	X	X	X	X		4
MariFish	Environment	X			X	X	4
VISION	Industrial Technologies and SMEs	X	X	X	X		4
WOODWISDOM-NET	Industrial Technologies and SMEs	X	X	X	X		4
BONUS	Environment	X	X	X			3
CIRCLE	Environment		X	X	X		3
ERA-AGE	Life Sciences		X	X	X		3
ERABUILD	Industrial Technologies and SMEs	X	X	X			3
ERA-NET ROAD	Transport		X	X	X		3
ETRANET	Industrial Technologies and SMEs		X	X	X		3
EUWI-ERA	Environment	X	X		X		3
MARTEC	Industrial Technologies and SMEs	X	X		X		3
MATERA	Industrial Technologies and SMEs		X		X	X	3
MNT ERA-NET	Industrial Technologies and SMEs		X	X	X		3
NEW OSH ERA	Industrial Technologies and SMEs	X	X	X			3
SKEP	Environment		X	X	X		3
TOTAL		20	25	24	24	8	

Source: Based on data gathered from European Commission (2009a)

The five Nordic countries participated in five networks concentrated in the following fields: “Social Sciences and Humanities”, “Industrial Technologies and SMEs”, “Energy” and “Life Sciences” (see Table 2 above).

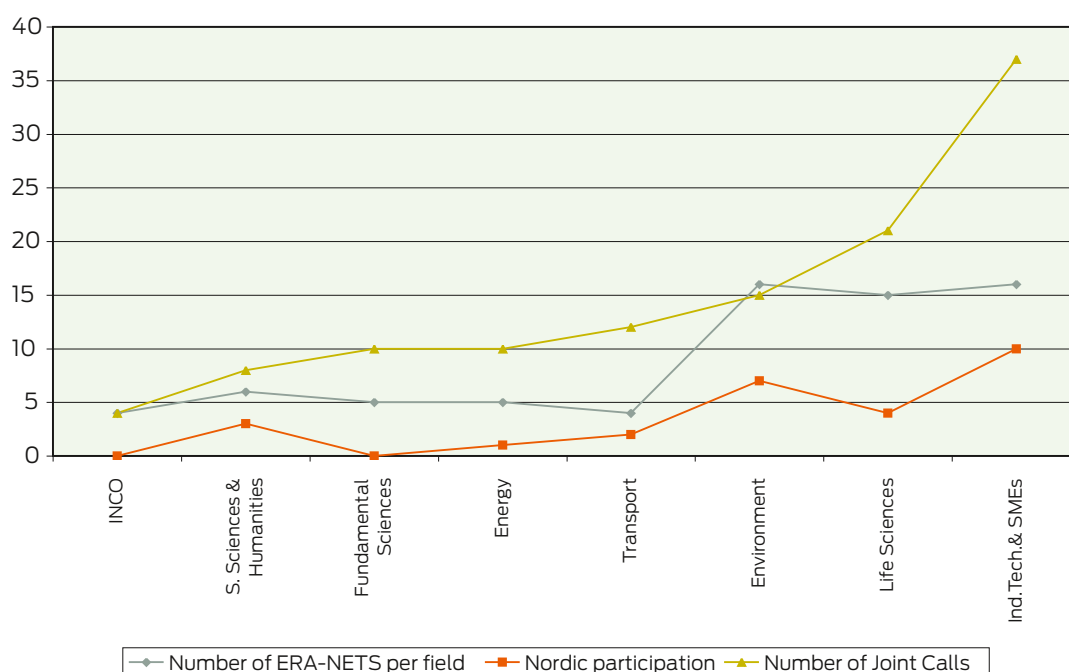
Figure 16 below presents the 27 FP6 ERA-NETs with intensive Nordic participation distributed by thematic field and number of joint calls. Figure 16 looks at the ratio between the number of ERA-NETs by field and the number of networks with intense Nordic participation, showing that the field with the most intense Nordic participation is “Industrial Technologies and SMEs”, followed by “Social Sciences and Humanities” and “Transport”. The ratio is lower in “Energy” and in “Life sciences”. As we can see, there is no Nordic participation in the fields of “Fundamental Sciences” and “INCO”.

The field with the most intense Nordic participation (“Industrial Technologies and SMEs”) actually corresponds with the most active field in terms of the number of joint calls launched under FP6.

Details regarding the funding agreements of the joint calls launched within the various thematic areas reveal that the proportion of funding allocated via a real common pot is higher in fields with intense Nordic participation than in the other fields¹⁹. This is particularly true for the field of “Social Sciences and Humanities”, where funding was allocated entirely via a real common pot. Interestingly, in the fields with no or less intense Nordic participation, the proportion of funding allocated via a common pot was close to zero.

These data suggest that the Nordic countries’ experience with using the common pot model may have some influence on the decision-making process regarding funding modes for joint calls.

FIGURE 16. TOTAL NUMBER OF FP6 ERA-NETS, ERA-NETS WITH INTENSE NORDIC PARTICIPATION, AND TOTAL NUMBER OF JOINT CALLS BY THEMATIC FIELD



Source: Based on data gathered from European Commission (2009a)

¹⁹ With the exception of “Industrial Technologies and SMEs” where the common pot model was marginally used (less than 1%).

As explained above, Table 2 and Figure 16 present the fields of interest for more than one Nordic country. This should not, however, be interpreted as a sign of a joint Nordic strategy, as different behaviours can be observed at the level of the individual country. These are probably the result of different national strategies for international R&D cooperation. Figure 17 below illustrates that Sweden participated in more FP6 networks on its own than the rest of its Nordic counterparts, while Finland showed more interest in collaborating on networks involving a single Nordic partner (mainly Norway and Sweden).

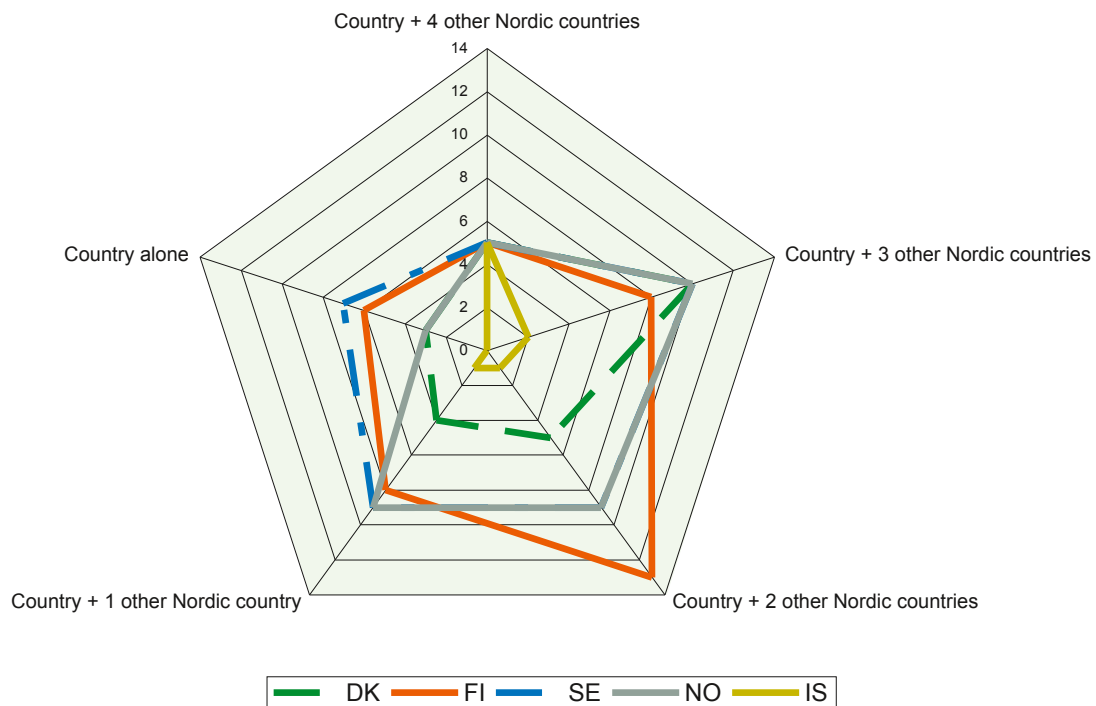


FIGURE 17. COOPERATION OF NORDIC COUNTRIES WITH OTHER NORDIC COUNTRIES IN FP6 ERA-NETs
Source: Based on European Commission (2009a)

The same analysis of the new ERA-NETs funded under FP7 (including ERA-NET Plus actions) reveals slightly less intensive Nordic participation. Out of a total of 40 new ERA-NETs, around 33% involve the participation of three or more Nordic countries, while only one network features the participation of all five Nordic countries (see Table 3). The thematic field of greatest interest to the Nordic region as a whole is “Social Sciences and Humanities”.

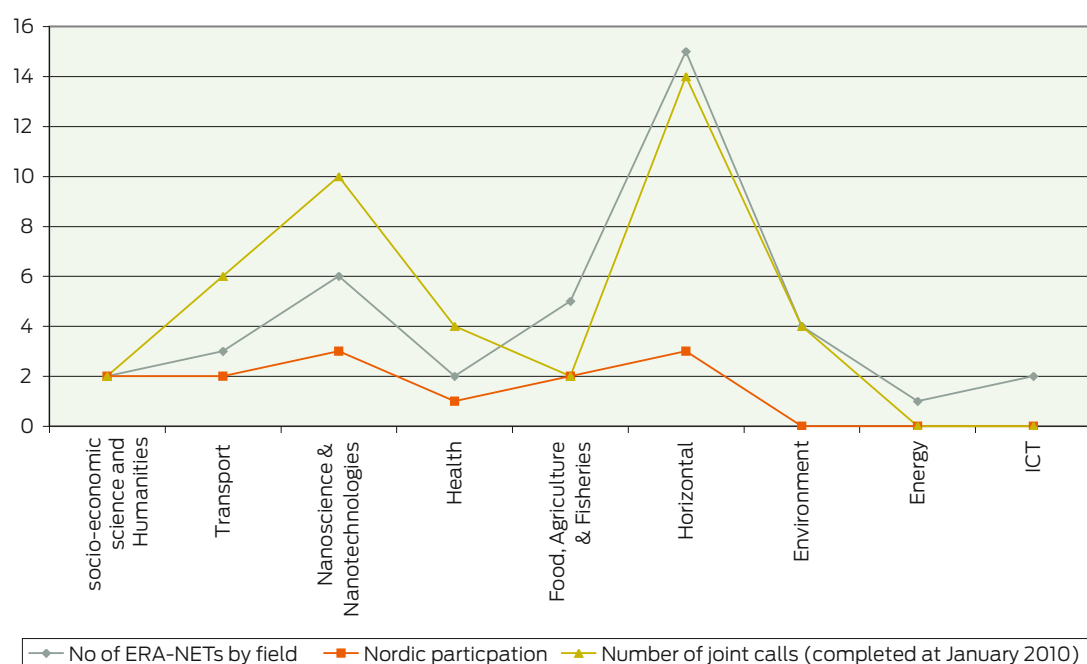
TABLE 3. FP7 ERA-NETS WITH INTENSE NORDIC PARTICIPATION

Name of ERA-NET	Thematic Field	DK	FI	SE	NO	IC	Total no. of Nordic countries
HERA JRP	Socio-economic Science and Humanities	X	X	X	X	X	5
EMIDA	Food, Agriculture and Fisheries	X	X	X	X		4
ENR2	Transport	X	X	X	X		4
ERACOBUILD	Nanoscience & Nanotechnologies	X	X	X	X		4
ERA-NET TRANSPORT II	Transport	X	X	X	X		4
EraSME2	Horizontal	X		X	X	X	4
EUROCOURSE	Health	X	X	X		X	4
iMERA-Plus	Horizontal	X	X	X	X		4
NORFACE Plus	Social Sciences and Humanities	X	X	X	X		4
ICT-AGRI	Food, Agriculture and Fisheries	X	X	X			3
KORANET	Horizontal	X	X	X			3
MATERA+	Nanoscience & Nanotechnologies		X		X	X	3
WoodWisdom-Net 2	Nanoscience & Nanotechnologies		X	X	X		3
TOTAL		11	12	12	10	4	

Source: Based on NETWATCH Information Platform

Aside from “Socio-economic Science and Humanities”, the fields with the highest Nordic participation are “Transport”, “Nanoscience & Nanotechnologies” and “Health”. There is no Nordic participation in the current ERA-NETs in the fields of “Environment”, “Energy” and “ICT”. Furthermore, the largest number of ERA-NETs and joint calls are found in the field “Horizontal”, in which Nordic participation is less prominent (see Figure 18).

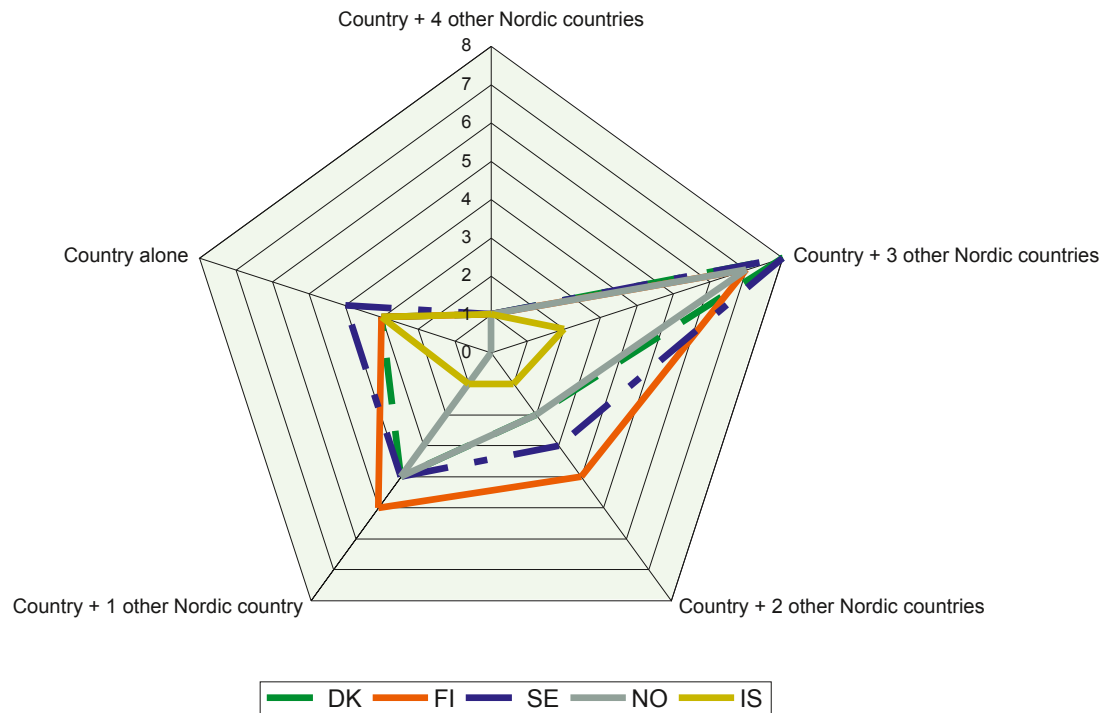
FIGURE 18. TOTAL NUMBER OF FP7 ERA-NETS, ERA-NETS WITH INTENSE NORDIC PARTICIPATION AND TOTAL NUMBER OF JOINT CALLS BY THEMATIC FIELD



Source: Based on NETWATCH Information Platform

As mentioned above, different countries have different strategies for international R&D collaboration. The behaviour patterns of the individual Nordic countries in FP7 ERA-NETs share some similarities with the patterns observed in connection with the FP6 ERA-NETs. Again, Sweden has the greatest involvement in networks in which no other Nordic country is participating, while Finland appears to prefer working in networks with only one or two Nordic counterparts. All in all it is clear that the four largest Nordic countries (Denmark, Finland, Norway and Sweden) tend to work together in FP7 ERA-NETs (see Figure 19).

FIGURE 19. COOPERATION OF NORDIC COUNTRIES WITH OTHER NORDIC COUNTRIES IN FP7 ERA-NETs

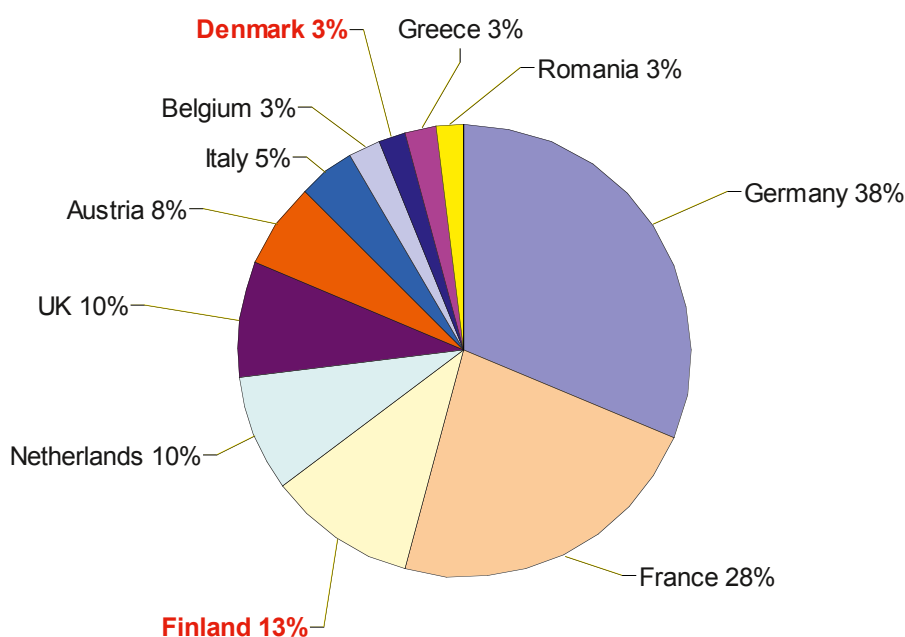


Source: Based on NETWATCH Information Platform

2.3. Nordic countries as network coordinators

As mentioned in Section 1.2, the role of the participating countries as coordinator is a valid proxy to better understand the centrality of the actors. Eleven countries serve as coordinators for the FP7 ERA-NETs (including ERA-NET Plus actions). France and Germany lead the largest number of networks. Two Nordic countries (Finland and Denmark) serve as coordinators. The distribution of coordinators by country is shown in Figure 20.

FIGURE 20. COORDINATION OF FP7 ERA-NETS BY COUNTRY



Source: Based on NETWATCH Information Platform

A total of 38 institutions serve as network coordinators, primarily in the role of programme manager²⁰.

The following Nordic organisations serve as coordinators:

- The Academy of Finland and the Finnish Funding Agency for Technology and Innovation (Finland)
- The Danish Food Industry Agency (Denmark)
- BONUS Baltic Organisations Network for Funding Science EEIG (international)²¹

2.4. Nordic contribution to joint calls and funding modes

According to NETWATCH, approximately 80% of the participants consider the design and implementation of joint calls to be a key strategic objective of the networks. The amount of funding invested in joint calls by the various participants in the ERA-NETs may provide greater insight into their true level of commitment.

As the majority of ERA-NETs and ERA-NET Plus actions under the FP7 are in the first stage of their lifecycle, no data on funding are available yet. However, the data on the individual country's funding contributions to joint calls launched by the FP6 ERA-NETs is a good indicator of the intensity of Nordic commitment in comparison to other countries and groups of countries.

²⁰ The term “programme manager” refers to national/regional organisations that implement research programmes under the supervision of the programme owners. These are typically research councils or funding agencies. The term “programme owner” refers to the national/regional authorities responsible for defining, financing or managing programmes carried out at national/regional level, e.g. ministries.

²¹ BONUS EEIG was established in 2007 and brings together different research funding organisations around the Baltic Sea: Danish Agency for Science, Technology and Innovation (Denmark), Estonian Science Foundation (Estonia), Research Council of Lithuania (Lithuania), FiRD Coop (Finland), Swedish Environmental Protection Agency (Sweden), Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas) (Sweden), Latvian Academy of Sciences (Latvia), Foundation for the Development of Gdansk University (Poland) and Forschungszentrum Jülich Beteiligungsgesellschaft mbH (FZ-GmbH) (Germany).

Table 4 provides information about the total funding contributions by country and also shows the proportion allocated via different funding modes.

TABLE 4. NORDIC CONTRIBUTION TO JOINT CALLS LAUNCHED BY FP6 ERA-NETS²²

Country	Total no. of funding contributions	Total funding (€)	Average contribution (€)	% common pot	% virtual pot	% mixed mode	% Other
Iceland	12	1,184,030	98,669	9.58%	90.42%	0.00%	0.00%
Nordic institutions	6	3,767,000	627,833	6.64%	82.74%	10.62%	0.00%
Norway	37	15,855,463	428,526	13.15%	86.85%	0.00%	0.00%
Denmark	30	17,205,310	573,510	10.84%	74.66%	12.17%	2.32%
Sweden	46	31,194,539	678,142	8.46%	76.82%	0.93%	13.78%
Finland	55	41,927,755	762,323	3.81%	81.38%	12.66%	2.15%
Total/Average (Nordic countries)	186	111,134,097	597,495	7.69%	79.98%	7.28%	5.04%
Total/Average (all contributing countries)	720	659,591,609	916,099	5.14%	88.25%	4.47%	2.14%

Source: Based on data gathered from European Commission (2009a)

The Nordic countries, together with Nordic cross-border institutions, made a total of 186 funding contributions to joint calls launched by FP6 ERA-NETs, which represents more than one-quarter of the total contributions. The Nordic contributions amounted to €111.13 million, or some 17% of the total funding invested by all participating countries (see Table 4 above).

The average contribution of the Nordic countries as a whole was approximately one-third of the average of all participating countries. This was mainly due to the low contribution of Iceland.

Among the Nordic countries, Finland was the largest contributor both in terms of the number of funding contributions (30% above the Nordic average) and of total amount of funding contributed (approximately 38% above the Nordic average). It was the sixth-largest contributor of all participating countries. Sweden was the second-largest contributor among the Nordic countries, accounting for 25% of the total number of funding contributions and 28% of total funding. Norway and Denmark each accounted for less than 20% of the total number of Nordic contributions and around 15% of the total amount of funding. Iceland, given its smaller size and capacity, contributed the least. It did, however, contribute more than other small countries such as Latvia, Cyprus, Lithuania and Slovakia.

Interestingly, two cross-border Nordic institutions (the Nordic Innovation Centre and the Nordic Forest Research Cooperation Committee) also contributed to joint calls. This is the only case in the entire ERA-NET scheme where we found cross-border organisations as partners in joint actions. Although their contribution was rather marginal (approximately 3.4% of the total Nordic contribution and about 0.5% of the total contribution of all participating countries), the fact that these institutions played an active role as contributors to joint calls is an important one.

The question of which funding mode to apply when funding transnational projects is a central issue with every call and has become a key issue in the policy debate on Joint Programming. The final decision regarding the funding mode to be used in a specific call depends on the partners in the consortium and the flexibility of national programmes.

²² The figures included in Table 4 are based on an externally generated dataset provided by DG RTD. A number of inaccuracies and inconsistencies in these data have been identified and rectified by JRC-IPTS to reduce possible distortion.

The ERA-NET scheme operates with three funding modes: real common pot, virtual pot and mixed mode

With a real common pot, countries pool their national contributions to establish a joint, centrally administered budget for the call. Funding is allocated to successful proposals irrespective of the applicant's nationality, resulting in transnational flows of funding. Funding for positively evaluated projects is ensured within the framework of the agreed overall budget. Table 4 above indicates that despite its benefits this funding mode was seldom used (approximately 5% of the total funding).

Use of a virtual pot involves countries paying for their own participants and thus does not promote transnational flows of funding. A joint budget is not established to fund the selected projects. Instead, each country funds its own national project partners in successful proposals and covers its own administrative costs. The advantage of this funding mode is that it is much easier to get the programme owners to agree on the budget for the call. As a result, this mode was used most frequently. As shown in Table 4, around 88% of the funding invested in joint calls launched by FP6 ERA-NETs used virtual pot.

Finally, there is a mixed mode, which is a combination of the two funding modes described above. With mixed mode, portions of the call budget are reserved for a real common pot to allow for compensation of mismatches between national funding contributions and requested budgets for successful proposals. Generally, an agreement must be reached regarding administrative procedures (e.g. costs of the secretariat). This funding mode was used the least by FP6 ERA-NETs (less than 5% of the total funding).

This imbalance is mainly due to existing barriers for the implementation of real common pot agreements²³. The following barriers are the most pressing:

- Receiving and distributing funding from other parties and funding foreign (non-resident) researchers is not common practice (or if it is it has to be linked to national research interests).
- There is reluctance to relinquish control of administrative procedures and final funding decisions.
- There is a need for more intensive steering by the joint call committee.

The behaviour of the Nordic countries mirrors the general EU trend: the virtual pot is the most commonly used funding mode, while common pot and mixed mode arrangements are used in a minority of cases.

However, it is important to note that the Nordic countries channel a higher percentage of contributions via a common pot than the EU average. While European countries contribute around 5% via a common pot on average, Nordic countries contribute almost 8%. All of the individual Nordic countries contribute more than the individual European countries (on average 5.14%), with the exception of Finland. Although, Finland is the largest Nordic contributor, it allocates less than 4% of total funding via a real common pot. Norway and Denmark are the largest contributors via common pot agreements among the Nordic countries, at 13.15% and 10.84%, respectively.

With regard to the other contributing countries, Estonia is the largest contributor via the use of a common pot (at about 38%), followed by Ireland (approximately 24%). Portugal, UK and Slovenia contribute approximately between 15 and 17%.

²³ This may apply to some extent to the mixed mode, at least to the portion of funding reserved for the common pot.

In relative terms, and taking into consideration other regions or clusters of countries (see Table 5), the contribution of the Nordic countries to joint calls is larger – both in terms of the total number of contributions and of the total amount of funding – than the contribution of the Mediterranean countries (Portugal, Spain, Italy and Greece).

In relation to the large EU countries (UK, France and Germany), the Nordic countries made a larger number of funding contributions to joint calls; however, the actual amount of funding contributed by the larger countries was double the Nordic contribution.

On average, the contribution of the Nordic countries via common pots is significantly higher than the contribution of the Mediterranean countries, and around one percentage point higher than the contribution of the large countries.

TABLE 5. CONTRIBUTION PER CLUSTER OF COUNTRIES TO JOINT CALLS LAUNCHED BY FP6 ERA-NETS (%)

Country cluster	% total no. of contributions (over total countries)	% of total funding (over total countries)	Average per contribution	% common pot	% virtual pot	% mixed mode	% Other
Nordic countries	25.83%	16.85%	597,495	7.69%	79.98%	7.28%	5.04%
Large countries	23.47%	36.13%	1,410,145	6.60%	85.26%	4.74%	3.39%
Mediterranean countries	13.75%	13.62%	907,189	2.46%	95.64%	1.89%	0.00%
Total/Average (all contributing countries)	720	659,591,609	916,099	5.14%	88.25%	4.47%	2.14%

Source: Based on data gathered from European Commission (2009a)

2.5. Preliminary conclusions

This section has analysed the participation of the Nordic countries in the ERA-NET scheme, looking at their net participation as well as examining it in the context of other variables linked to the capability of a country to engage in R&D collaboration activities.

The Nordic countries' participation in the ERA-NET scheme is slightly higher on average than all of the MS and similar to that of the Mediterranean countries.

The level of participation in ERA-NETs may be related to different factors linked to a country's size in terms of GDP, total population and human resources employed in S&T. The analysis of each of these variables provided a very similar picture: small and large countries have distinct patterns of participation in joint R&D initiatives. Obviously, countries the size of Germany or France have more resources and capacity at their disposal and, thus, their participation tends to be higher. In contrast, small countries with more limited capacity could be expected to concentrate their participation in areas of national strength. However, participation based on specialisation is not the only factor underlying the participation pattern of the Nordic countries. These countries are highly specialised in certain fields of national interest, but at the same time they participate in a broader range of networks that are not directly linked to their areas of expertise. This is particularly true for Finland and Sweden. A plausible explanation is that these countries are exploring new areas by joining a large number of international networks and that their internationalisation strategies are at least partially based on the principle of "observe and learn".

Regardless of country size, the data on R&D intensity showed that the Nordic region (with the exception of Norway) present a distinct behaviour compared to the other European countries. One of the questions raised at this point is whether the R&D programmes and initiatives in place in the Nordic region are a substitute for, rather than a supplement to, cooperation at a wider level.

The analysis of the networks in which three or more Nordic countries participated identified clear fields of interest to the region as a whole. Under FP6, “Industrial Technologies and SMEs” together with “Social Sciences and Humanities”, “Energy” and “Life Science” were the thematic areas with the most intense Nordic participation. Interestingly, the greatest number of joint calls was launched in the field of “Industrial Technologies and SMEs”. Under FP7, Nordic participation appears to be most intense in the field of “Social Sciences and Humanities”.

Although they have fields of common interest, the Nordic countries have different approaches to participation at the European level stemming from different national strategies and technological profiles. Thus, it cannot be argued that a joint Nordic strategy for participation actually exists. The distinct specialisation profiles of the individual Nordic countries as well as their different behaviours in joining networks indicated different participation patterns. Finland seems to be more proactive in its participation in ERA-NETs, with a higher degree of involvement and coordination of a larger number of networks. Sweden appears to take more of a hybrid approach based on observing and learning. While Sweden has joined a large number of initiatives, it does not lead a network. Denmark and Norway play a more modest role, with a medium level of participation and very few coordinating roles. Finally, as expected given its small S&T sector and population, Iceland has the lowest degree of involvement. It generally participates in networks in which the other four countries participate.

Although the Nordic countries only take on leadership roles to a limited extent, data on funding revealed a significant degree of commitment from these countries in the joint actions. They contributed more than one-quarter of the total funding contributions and around 20% of the total amount of funding invested in the calls launched by FP6 ERA-NETs. In relation to the two other clusters of countries, the Nordic countries’ total number of contributions was higher than that of the large countries and the Mediterranean countries. In terms of total funding committed, the Nordic countries invested three percentage points more than the Mediterranean countries and around one-half as much invested by the large countries.

Interestingly, two Nordic cross-border institutions (the Nordic Innovation Centre and the Nordic Forest Research Cooperation Committee) also contributed to FP6 calls. Although the amount of resources invested by these organisations was rather marginal, it is important to point out that they played an active role. They were the only cross-border institutions involved in the calls, which reveals a clear interest in pooling Nordic resources in joint EU actions.

The questions of which funding mode to apply and how to organise joint budgets are still open for discussion and have become key issues in the debate on how to implement the Joint Programming Initiatives at EU level. Looking at the ERA-NETs under FP6, we can see that the vast majority of the joint calls used the virtual pot model, while a minority of the calls (around 5%) used the real common pot model.

Although the Nordic countries mirrored the European trend, making extensive use of virtual pots, they did, on average, channel a higher proportion of funding via a real common pot. Different national approaches were also evident here. Norway and Denmark made the largest number of contributions via real common pots, while Finland made the smallest. The analysis revealed that the real common pot model was used more frequently in networks with intense Nordic participation than in networks with no Nordic participation. This may suggest that the Nordic countries exerted some degree of influence on decision-making concerning the choice of funding modes.

Experience in Europe with the opening-up of national programmes and funding modes that involve transnational flows of funding is relatively limited. Attempts to increase the use of common pot arrangements could thus benefit from the Nordic countries' experience with common pot agreements for various projects and jointly-funded initiatives. Successful examples in the Nordic region, such as the Top-level Research Initiative (TRI), can serve to encourage the move towards the use of real common pots at EU level. The TRI provides support for cross-border communities, allocating project funding on the basis of competence and excellence rather than national affiliation. The development of the TRI sub-programmes has inspired the Nordic countries' to adapt their research programme portfolios to a certain extent – demonstrating that initiatives using the real common pot model have the power to influence national research priorities.



3. Nordic participation in Article 185 initiatives

Article 185 of the Lisbon Treaty (previously Article 169) builds on the ERA-NET scheme and makes provision for MS to integrate their research efforts by establishing and committing themselves to joint research programmes. It also enables the European Community to participate in research programmes undertaken jointly by several MS.

This section presents an overview of Nordic participation in the four active Article 185 initiatives:

- Ambient Assisted Living
- Eurostars
- European Metrology Research Programme
BONUS-169

3.1. Ambient Assisted Living

Ambient Assisted Living (AAL) is a joint R&D funding programme implemented by 20 MS and three Associated Countries (AC)²⁴. Its objective is to enhance the quality of life of older people and strengthen the industrial base in Europe through the use of information and communication technologies (ICT).

The programme will run from 2008 to 2013, and has a total budget of €700 million, of which approximately one-half is provided by public funding from the AAL Partner States and the European Commission²⁵ (maximum €150 million), and the other half by private funding from participating private organisations.

All of the Nordic countries with the exception of Iceland are involved in the programme. As under the ERA-NET scheme, the countries participate via funding agencies:

- Denmark: The Danish Agency for Science, Technology and Innovation
- Finland: The Finnish Funding Agency for Technology and Innovation (Tekes)
- Norway: The Research Council of Norway
- Sweden: The Swedish Governmental Agency for Innovation Systems (VINNOVA)

The annual funding amount (indicative) per country²⁶ shows that the average contribution per country is around €1.5 million. The contribution of the individual Nordic countries is below this average, with the exception of Finland, which is among the largest contributors²⁷ – in line with national ambitions to be a leader in the “well-being” field.

The total annual contribution (indicative) of the four Nordic countries is approximately 12%, which is rather similar to the contribution of the new MS (Romania, Slovenia, Poland and Hungary) and around one-half of the contribution of the Mediterranean countries (Portugal, Spain, Italy and Greece) and the large countries (France, Germany and UK).

24 Member States: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Poland, Portugal, Romania, Slovenia, Spain, Sweden and UK. Associated Countries: Israel, Norway and Switzerland.

25 Maximum €150 million.

26 Source: Presentation by Silas Olsson, Acting Head of Unit, AAL Association, Central Management Unit. 31 May 2010, Brussels. Available at: <http://www.aal-europe.eu>

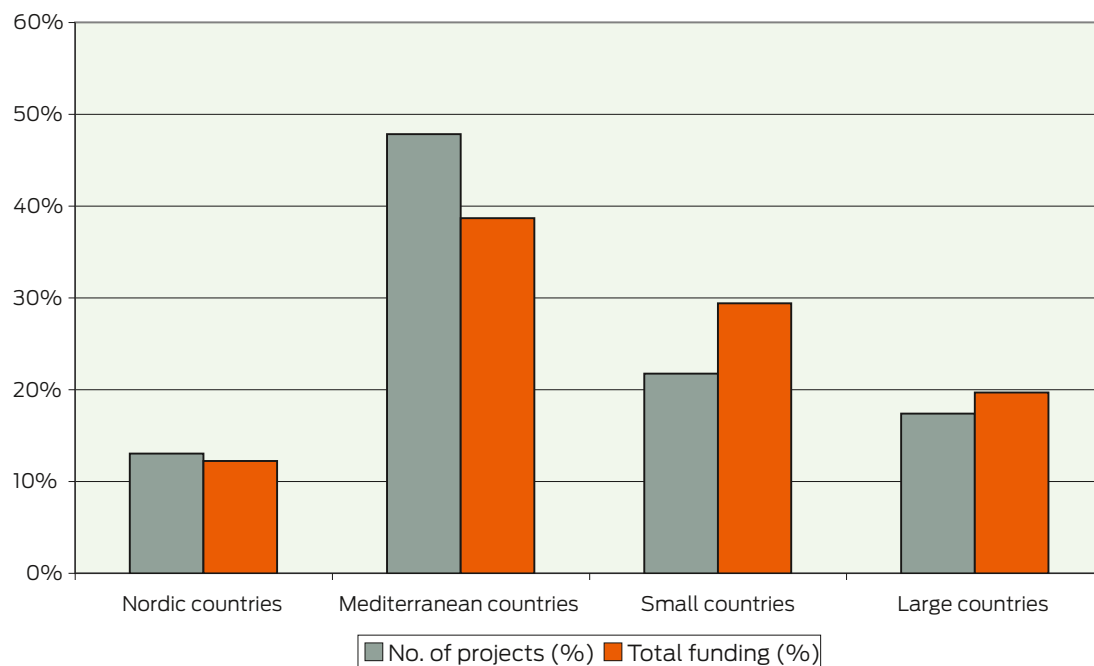
27 Finland has contributed €2.5 million, the same amount as Austria, Hungary and Italy. The large countries Germany and France have contributed the most.

The main activity under the AAL Joint Programme is the funding of R&D projects selected via regularly published calls for proposals. The programme has issued three joint calls thus far.²⁸

The first call (closed in August 2008) resulted in the funding of 23 projects for a total of 40.3 million. As with the ERA-NETs in the previous section, we have examined the individual countries' role as coordinators of the projects approved for funding to better understand the centrality of their involvement. Of the 23 countries supporting the initiative, only one-half serve as coordinators of projects funded under the first call. We have grouped the coordinators into four clusters: Mediterranean countries (Spain, Italy and Greece),²⁹ large countries (France, Germany and UK), Nordic countries (Denmark, Finland, Norway and Sweden), and small countries (Austria and the Netherlands).

As Figure 21 below shows, the role of the Nordic countries is limited, although they do serve as coordinators. They coordinate around 13% of the total projects funded, which represents a similar percentage of the total funding they invested in the first call. The other groups of countries, particularly the Mediterranean countries, play a more prominent role.

FIGURE 21. COORDINATION OF PROJECTS FUNDED UNDER THE FIRST AAL JOINT CALL AND TOTAL FUNDING OF COORDINATED PROJECTS BY GROUP OF COUNTRIES



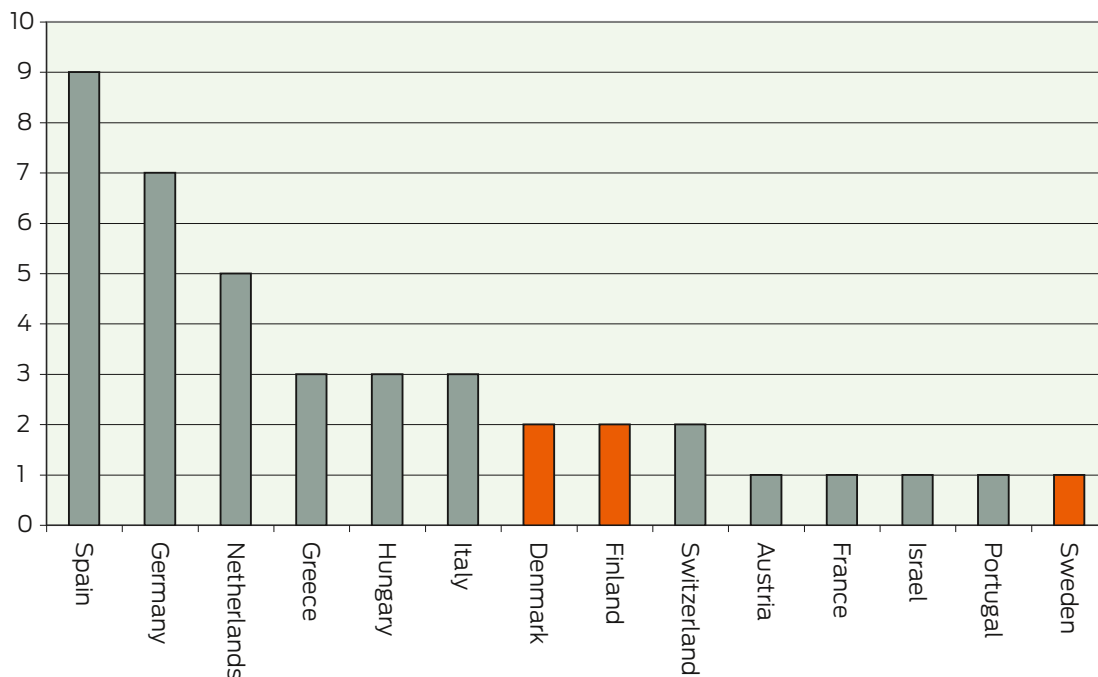
Source: Based on data gathered from <http://www.aal-europe.eu/calls>

²⁸ First call entitled "ICT based solutions for Prevention and Management of Chronic Conditions of Elderly People"; second call entitled "ICT based solutions for Advancement of Social Interaction of Elderly People"; third call entitled "ICT based solutions for Advancement of Older Persons' Independence and Participation in the "Self-Serve Society". The third call closed recently (30 July 2010), thus there is no data available yet.

²⁹ Portugal is not participating.

According to available data on the second call (closed in May 2009) a total of 104 proposals were received, of which 41 were positively evaluated by independent referees.³⁰ Of these 41, five projects are being coordinated by Nordic countries (Denmark, Finland and Sweden), which indicates a small but stable participation rate (see Figure 22 below).

FIGURE 22. COORDINATION OF POSITIVELY EVALUATED PROPOSALS UNDER THE SECOND AAL JOINT CALL



Source: AAL report on statistics for call for proposals AAI-2009-2

3.2. Eurostars

The Eurostars Programme is the first multiannual, European joint funding programme (2007-2013) specifically dedicated to R&D-performing SMEs. The 32 European member countries of the EUREKA network and the European Commission are involved in the initiative.

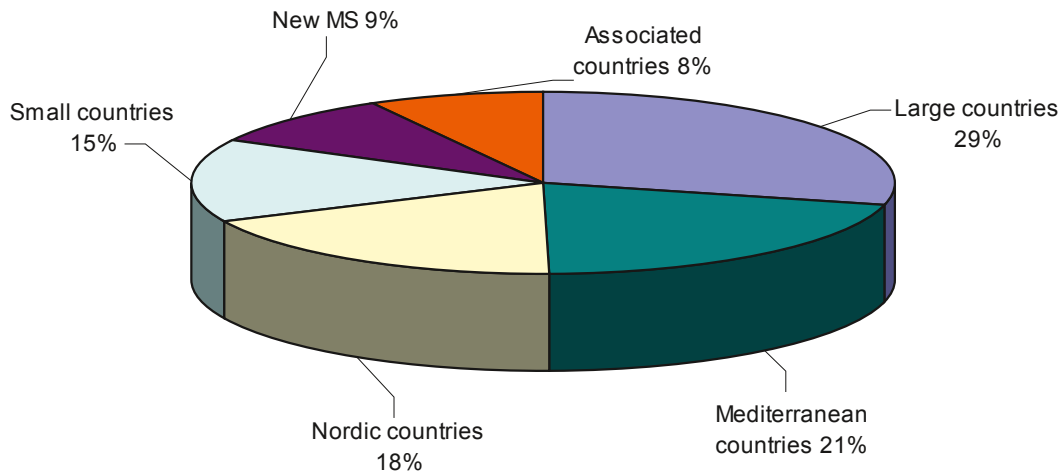
All of the Nordic countries are participating in the programme, again through funding agencies:

- Denmark: The Danish Agency for Science, Technology and Innovation
- Finland: The Finnish Funding Agency for Technology and Innovation (Tekes)
- Norway: The Research Council of Norway
- Iceland: Innovation Center Iceland
- Sweden: The Swedish Governmental Agency for Innovation Systems (VINNOVA)

³⁰ Please note that this data refers to ranked proposals and not to projects funded. Not all the ranked proposals will receive funding under this call.

The Eurostars Programme accepts funding applications on an ongoing basis³¹. Figure 23 illustrates the participation of clusters of countries in projects approved under the first three calls. The figure shows that the rate of participation of the Nordic countries is similar to that of the Mediterranean countries³², and is higher than that of the small countries³³, the new MS³⁴ and the associated countries.³⁵ As under the other initiatives, the large countries³⁶ have the highest rate of participation.

FIGURE 23. PROJECTS APPROVED UNDER THE FIRST 3 EUROSTARS CUT-OFFS BY GROUPS OF COUNTRIES



Source: Based on data available at <http://www.eurostars-eureka.eu/search.do>

Figure 24 shows the number of projects approved for funding and the participation of the individual Nordic countries as a percentage of the total number of projects funded under the three cut-offs. Sweden is the most active followed by Norway and Denmark. Finland is less active in the Eurostars Programme, and once again Iceland's participation is rather marginal. The number of SMEs varies significantly from one country to another, which may explain the differences in the Nordic countries' level of involvement.

³¹ The Fifth Eurostars Cut-off has a deadline of 30th September 2010. Data on projects are only available for the first three cut-offs.

³² Portugal, Spain, Italy and Greece.

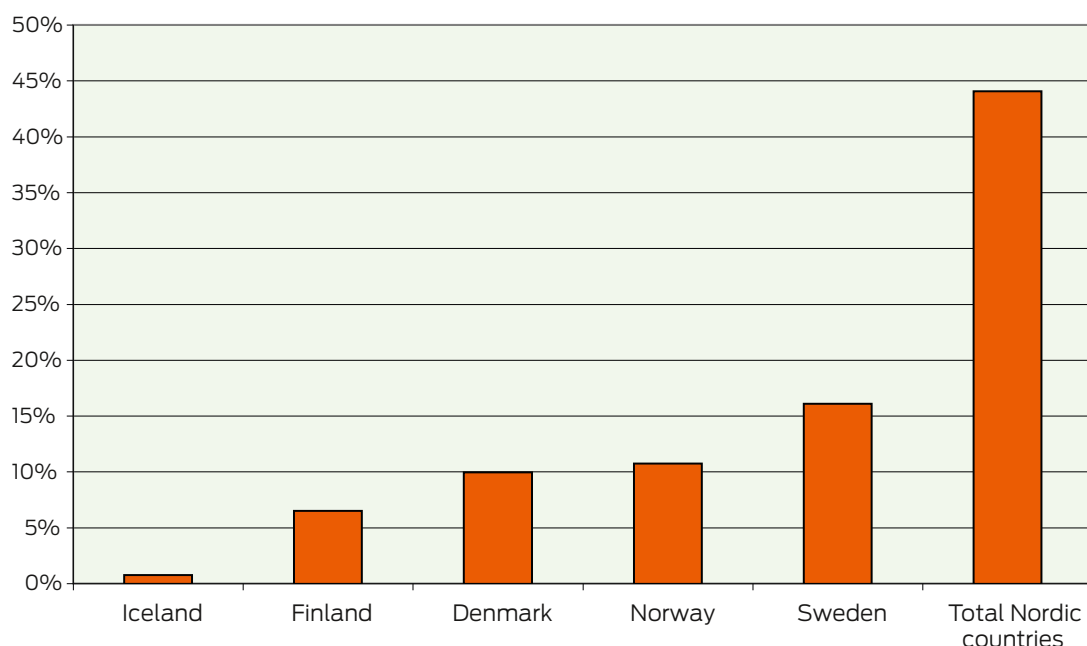
³³ Austria, Belgium, Cyprus, Estonia, Ireland, Latvia, Lithuania, Luxembourg and the Netherlands.

³⁴ Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia.

³⁵ Israel, Switzerland and Turkey.

³⁶ France, Germany and UK.

FIGURE 24. APPROVED PROJECTS BY COUNTRY UNDER THE FIRST 3 EUROSTARS CUT-OFFS (%)



Source: Based on data available at <http://www.eurostars-eureka.eu/search.do>

3.3 European Metrology Research Programme

The European Metrology Research Programme (EMRP) is a joint programme in the field of metrology, the science of measurement, undertaken by 22 member countries³⁷ of the European Association of National Metrology Institutes (EURAMET).

It consists of two phases: (a) Phase 1 (iMERA-Plus) was developed under ERA-NET Plus, and (b) Phase 2 was developed as an Article 185 initiative.

The first phase was launched in 2007. Publicly-funded metrology laboratories in some 19 European countries and the European Commission's measurement institute (IRMM) pooled their resources and launched a single joint call for metrology research projects. They contributed a total of €64.6 million, of which the European Commission contributed €21 million.

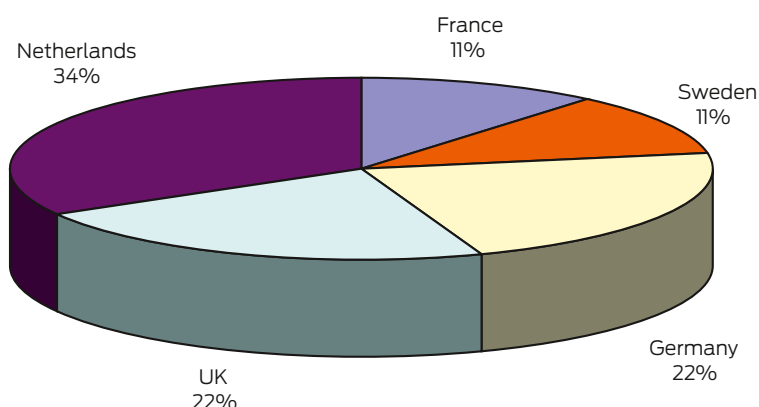
The second phase has a total budget of €400 million to be allocated over a period of approximately seven years. In this phase the user community and other stakeholders have the opportunity to propose topics to be given priority by the metrology community.

All of the Nordic countries with the exception of Iceland are participating in this initiative.

The initiative launched one joint call in 2009 in the field of Energy, which resulted in the funding of nine projects. As Figure 25 illustrates, the Netherlands is the leader when it comes to taking on the role of coordinator (it coordinates three projects). Sweden is the only Nordic country serving as coordinator. As these projects are in an early stage, there is currently very little information on results, so it is not possible to draw any conclusions regarding country involvement and the joint actions developed.

³⁷ Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and UK.

FIGURE 25. COORDINATION OF APPROVED PROJECTS UNDER THE 2009 CALL BY COUNTRY



Source: Based on data available at <http://www.euramet.org>

3.4. BONUS-169 Joint Baltic Sea Research Programme

The BONUS-169 Joint Baltic Sea Research Programme is an integral part of the EU Strategy for the Baltic Sea which seeks to provide a coordinated framework to deal with key challenges facing the region. It is also fully aligned with the objectives of the European Strategy for Marine and Maritime Research.

The programme is managed by BONUS EEIG (European Economic Interest Grouping), a network of Baltic organisations that provide funding for science founded by the eight Baltic Sea EU MS³⁸ (Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Sweden and Poland). It is jointly funded by the EU and all members and associated members of the EEIG, as well as by other donors, and will run from 2010 to 2016. The European Community will match the participants' contributions up to a maximum of €50 million, giving the programme an expected budget of €100 million.

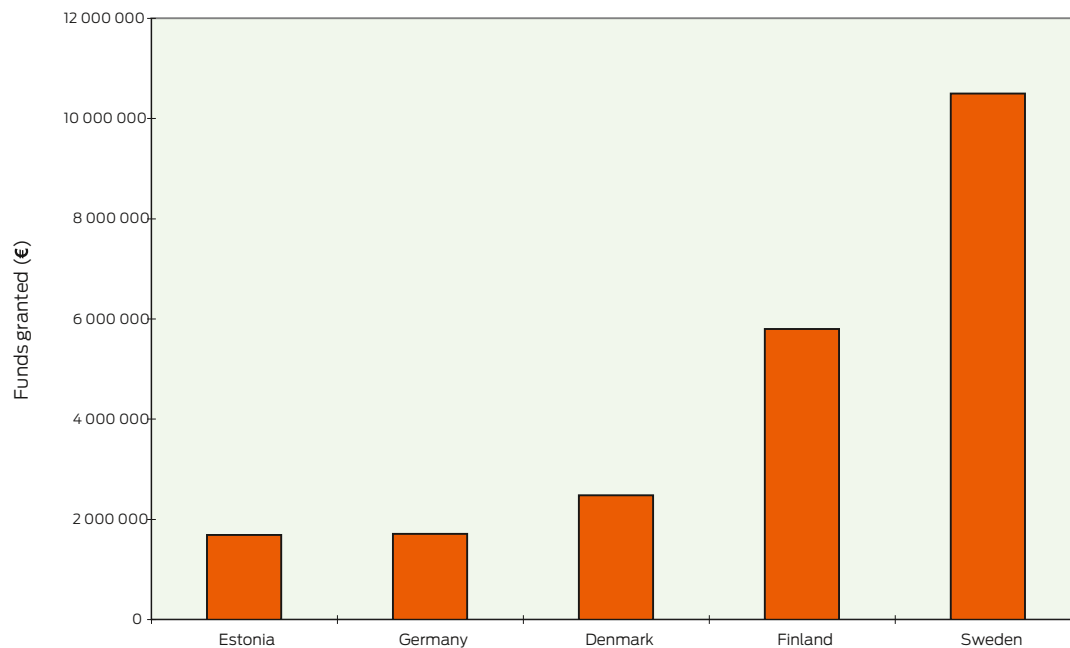
The BONUS-169 programme is being implemented in two phases³⁹: a Strategic Phase during 2010-2011, followed by an Implementation Phase during 2012-2016.

³⁸ The Russian Foundation for Basic Research will join the EEIG as an associated member.

³⁹ The preliminary work was performed under the ERA-NET BONUS.

Under the first joint call, 16 projects received funding totalling €22.3 million. The average amount of funding per project was around €1.4 million. As expected given the Baltic focus, Nordic participation in the programme is extremely high. Nordic countries coordinate 14 projects, which account for 85% of total funding granted (see Figure 26). Sweden in particular plays a significant role, coordinating one-half of the projects for a total of approximately €10.5 million.

FIGURE 26. NUMBER OF PROJECTS COORDINATED AND AMOUNT OF FUNDING GRANTED BY COUNTRY



Source: Based on data available at http://www.bonusportal.org/research_projects

3.5. Preliminary conclusions

Although Nordic countries participate in all four active Article 185 initiatives, their involvement appears to be of a modest nature, except in the case of the BONUS-169 Joint Baltic Sea Research Programme. This is understandable given the strategic importance of the Baltic Sea for the Nordic region. Sweden plays the most active role in the programme, followed by Finland.

With regard to the Ambient Assisted Living (AAL) Joint Programme, the contribution of the Nordic countries is below the average, with the exception of Finland. Finland is actually one of the largest contributors; this topic is clearly a national priority. At the aggregate level, the Mediterranean countries' involvement is much higher than the Nordic countries'.

Under the Eurostars Programme, the degree of participation varies from one country to another due to differences in the number of SMEs in each country. Although Sweden plays a more active role than its Nordic counterparts, its role in this programme is still rather limited.

Sweden is also the Nordic country with highest involvement in the European Metrology Research Programme (EMRP), but again its role is rather marginal.

As in the case of the ERA-NETs (see Section 2), the Nordic actors involved in the initiatives are primarily funding agencies (in general, the Danish Agency for Science, Technology and Innovation, Tekes, the Research Council of Norway, and VINNOVA).



4. Nordic participation in Joint Programming Initiatives

The overall aim of the Joint Programming (JP)⁴⁰ process is to pool national research efforts to make better use of European public R&D resources and tackle common societal challenges more effectively. This process combines a strategic framework, a bottom-up approach and high-level commitment from MS. It builds on the experience gained from existing schemes for coordinating national programmes, such the ERA-NET scheme and Article 185 projects (see Sections 2 and 3 above).

Suitable areas for JP are identified by a High Level Group on Joint Programming (GPC).⁴¹ Based on the result of the GPC's meetings, the European Council, upon a proposal by the European Commission, recommends a limited number of areas in which to implement JP. To date three Joint Programming Initiatives (JPIs) have been approved:⁴²

- Agriculture, Food Security and Climate Change
- A Healthy Diet for a Healthy Life
- Cultural Heritage and Global Change: a new challenge for Europe

Participation in JP is structured, voluntary and variable. That is, participation of MS in the individual initiatives is based on voluntary commitments leading to partnerships composed of varying groups of countries.

The Nordic countries provide considerable support for the JPIs Agriculture, Food Security and Climate Change and A Healthy Diet for a Healthy Life. The Nordic countries appear to have great potential for contributing to defining and implementing joint research agendas. As only Iceland supports the JPI on cultural heritage, this initiative has not been analysed in this section.⁴³

Due to the fact that the above-mentioned JPIs are in a very early stage of development – the framework conditions, governance structures and even the supporting countries are still being defined – the analysis in this section mainly deals with inputs, e.g. number of countries, number of support measures and available budget. The analysis is primarily based on data from ERAWATCH and focuses on specific support measures (research programmes or sub-programmes) related to the theme of each JPI. The existing support measures of the countries supporting the JPIs and their budgets (or estimated budgets) for 2009 are examined. The ERAWATCH data has been supplemented by additional research carried out by JRC-IPTS.

Although in many cases the research programmes are partially co-financed, by the private sector, the EU or both, our focus has solely been on national budgets. However, it is not always possible to

40 The Joint Programming process was set out in the 2008 Commission Communication.

41 GPC stands for “Groupe de Programmation Conjointe” and consists of nominees from MS and the European Commission.

42 By the end of 2010, the Council will adopt an initial set of initiatives.

43 As mentioned in Section 1.1, the criterion for defining Nordic participation in a concrete initiative is that at least three Nordic countries are involved.

ascertain whether the ERAWATCH budget data includes some co-funding. To avoid overestimation, when there is sufficient data, data are corrected to reflect only the national budgets.

Furthermore, given the high degree of complexity and interdisciplinarity of the themes addressed by the JPIs, it is not possible to cover the entire spectrum of existing financial measures implemented by all of the countries involved. The internal structure of the national research systems in Europe also differs greatly, making it difficult to fully identify very specific sub-programmes.

Despite the above-mentioned limitations of the data base, we believe this analysis provides valuable insight into the research potential and capacity of the countries in relation to the themes of the JPI.

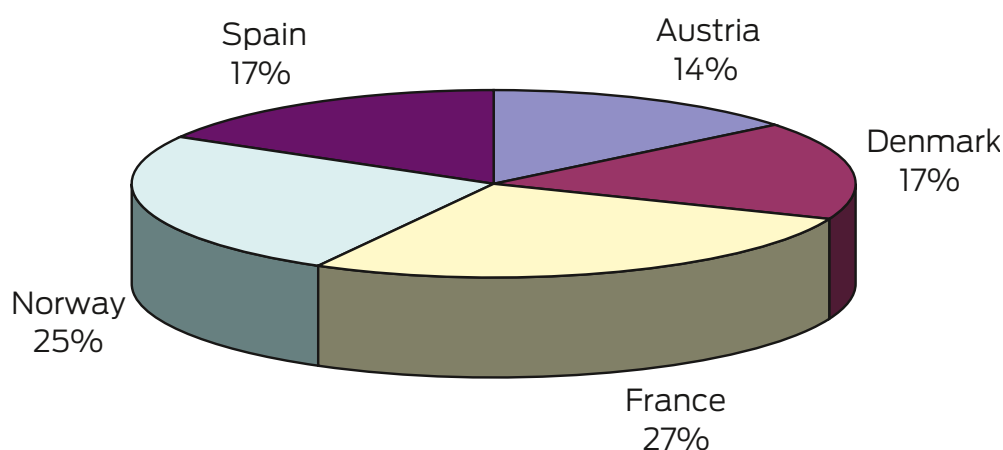
4.1. Agriculture, Food Security and Climate Change

This JPI proposal⁴⁴ includes 12 countries so far, and focuses on how to address challenges relating to food security in the context of the continuous threat posed by various scenarios of climate change.

According to ERAWATCH, less than half of the supporting countries have specific support measures dealing with food, food security, agriculture or the impact of climate change on these. As of 2009, a total of 10 specific support measures related to the JPI theme were in place in five countries (Austria, Denmark, France, Norway and Spain),⁴⁵ for a total of around €112 million.

Figure 27 shows that France and Norway account for the largest proportion of total expenditure, with around 26%, followed by Denmark and Spain with 17%. The expenditure of the Nordic countries (i.e. Norway and Denmark) in 2009 accounted for more than 42% of the total, which implies that the Nordic region has extensive experience and excellent potential to take the lead in this field and contribute to the implementation of joint actions.

FIGURE 27. SPECIFIC SUPPORT MEASURES RELATED TO THE JPI THEME BY PARTICIPATING COUNTRY (2009)



Source: Based on ERAWATCH Research Inventory

⁴⁴ For a more detailed analysis of national public R&D investment, research programmes and transnational collaboration in Europe in relation to this JPI, see Haegeman (2010).

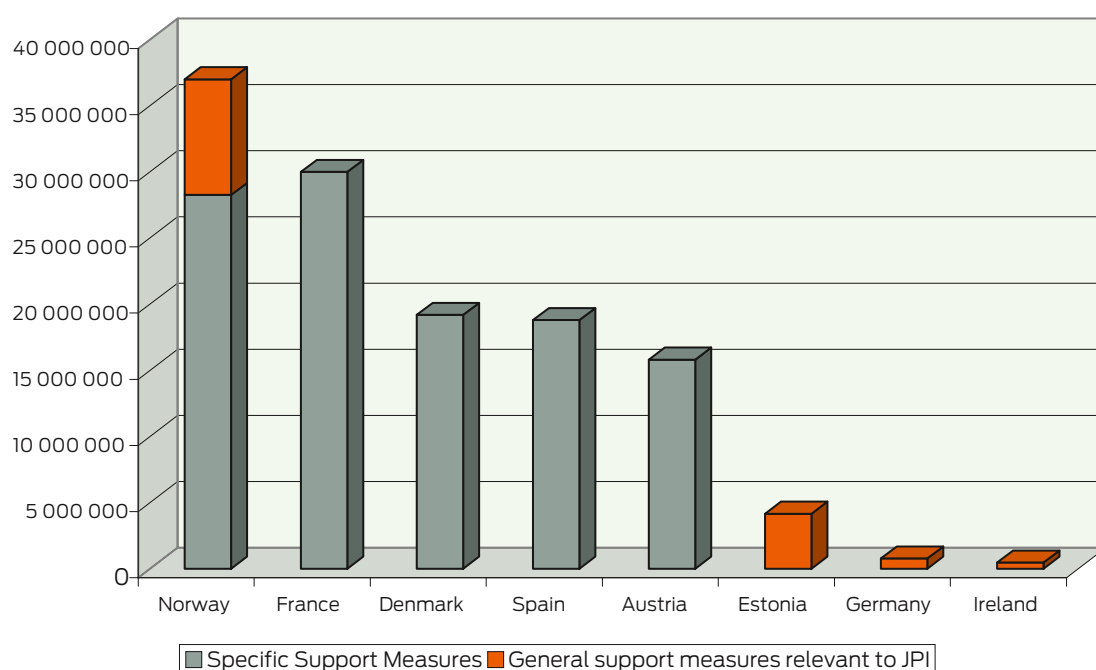
⁴⁵ Belgium and Latvia also have specific measures in place but since they are not participating in this JPI their support measures have not been included in this sum.

In addition to specific support measures, many countries employ more general measures in which food, food security, agriculture or the impact of climate change on these is mentioned, but where the budget allocated for these specific areas is less clear.

Six general support measures have been identified in four countries⁴⁶ participating in this JPI. Only Norway⁴⁷ has both specific and general measures in place. The countries' total budget for these six measures is estimated at €73 million for 2009. However, in this context, it is more relevant to look at the overall proportion of these support measures that is specifically related to the theme of the JPI than the overall budget. This total has been estimated⁴⁸ at around €14 million. Adding this €14 million to the value of the specific support measures (€112 million) brings the total estimated value of national R&D investments directly related to the JPI theme to €126 million.

The distribution by country in Figure 28 shows that Norway and France are the largest investors, followed by Denmark, Spain and Austria.

FIGURE 28. ESTIMATED AVAILABLE BUDGET FOR SPECIFIC AND GENERAL NATIONAL SUPPORT MEASURES RELATED TO THE JPI BY PARTICIPATING COUNTRY (2009)



Source: Based on Haegeman (2010)

⁴⁶ One general support measure in Estonia, one in Germany, one in Ireland and three in Norway.

⁴⁷ And Latvia, but it is not a JPI member.

⁴⁸ Haegeman (2010).

The Nordic budget (Norway and Denmark combined) for specific and general research measures related to this JPI represents nearly half (45%) of the total value of all the support measures of the participating countries.

As illustrated in Figure 28 above, some countries that support the JPI (e.g. Finland, Italy, the Netherlands and UK) do not appear to have support measures. According to Haegeman (2010), this may be explained by a combination of methodological reasons. To develop a more comprehensive analysis, additional research budgets have been estimated based on the budgets of the major funding organisations for these specific fields. In the case of Finland, the budget has been estimated at approximately €103.55 million, based on expected contributions from the three major funders of agricultural research: the Ministry of Agriculture and Forestry, Tekes, and the Academy of Finland.⁴⁹

4.2. A Healthy Diet for a Healthy Life

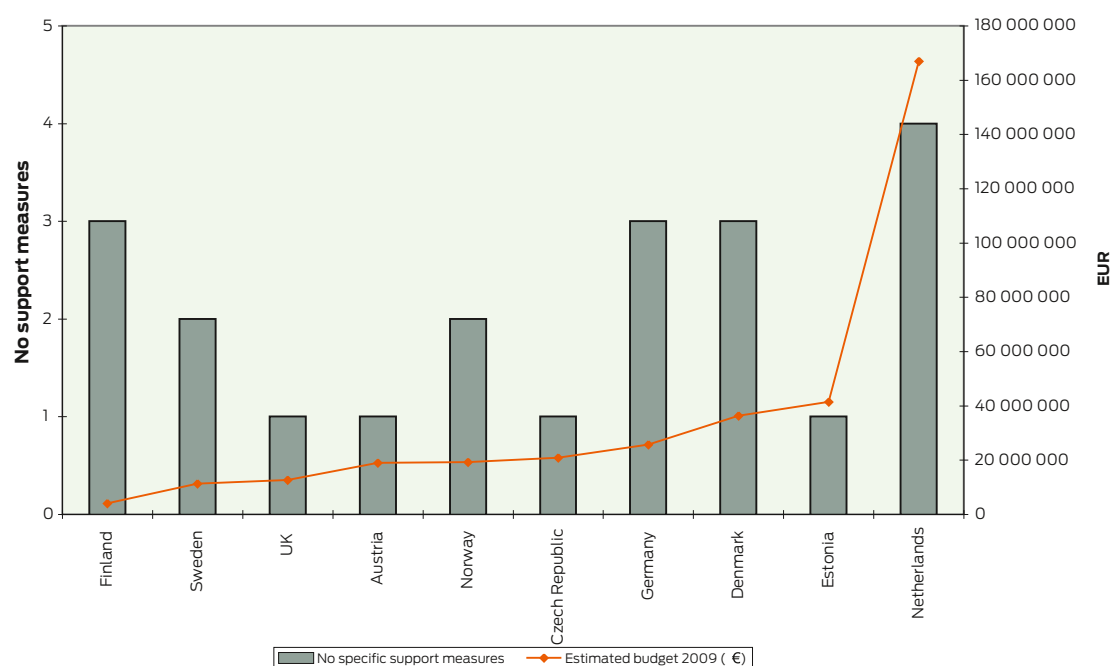
This JPI, supported by 15 countries so far,⁵⁰ deals with challenges related to health, food and prevention of diet-related diseases. The theme is particularly broad, encompassing areas related to the promotion of healthy nutrition, reduction of obesity in children and prevention of diet-related diseases, which makes it more difficult to provide accurate data on existing national support measures. The following data probably do not cover the entire spectrum of national support measures; therefore, the estimates provided should be taken solely as an indicator of the budget framework. The total budget for this JPI will most likely be higher.

According to ERAWATCH (see Figure 29), 21 specific support measures from 10 participating countries (four of which are Nordic) are related to the theme of the JPI. The combined budget for these support measures is estimated at around €357.5 million. The Netherlands, which is the largest investor in this JPI, accounts for almost one-half of the total budget for 2009.

49 For detailed information, see Haegeman (2010).

50 Netherlands, Austria, Czech Republic, Denmark, Estonia, France, Ireland, Italy, Finland, Germany, Lithuania, Norway, Sweden, UK, and Turkey.

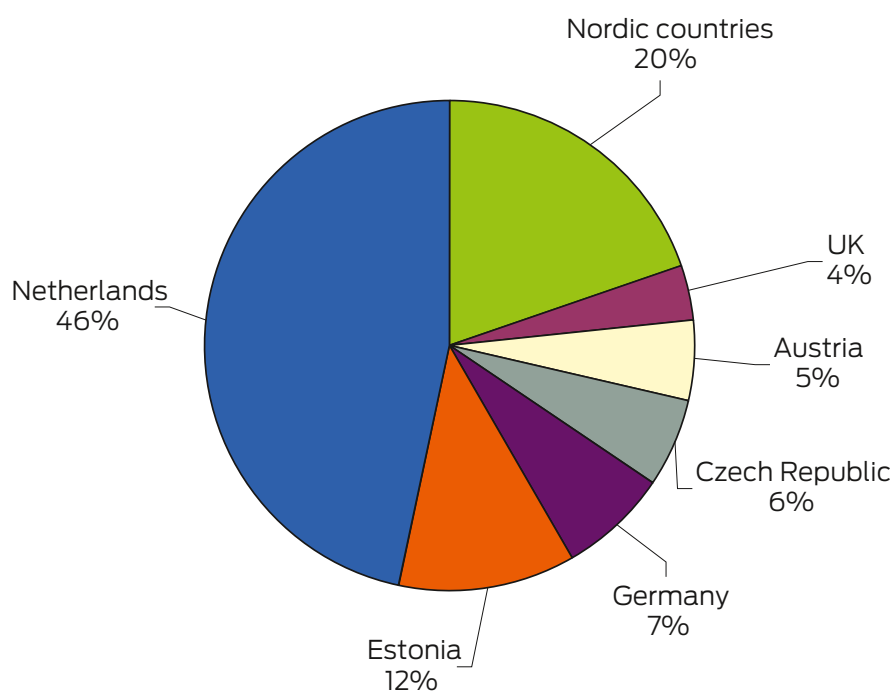
FIGURE 29. NUMBER OF SPECIFIC SUPPORT MEASURES RELATED TO THE JPI AND ESTIMATED BUDGET (2009) BY PARTICIPATING COUNTRY



Source: Based on ERAWATCH Research Inventory data

The estimated budgets of the individual Nordic countries are rather low, with the exception of Denmark, whose budget comprises 10% of the total estimated budget of the participating countries. In aggregate terms, the Nordic region has an estimated budget of approximately €80 million or 20% of the total (see Figure 30 below). In relation to the other supporting countries, the Nordic region is once again a significant player.

FIGURE 30. 2009 ESTIMATED BUDGET OF SUPPORT MEASURES BY PARTICIPATING COUNTRIES (%)



Source: Based on ERAWATCH Research Inventory data

4.3. Preliminary conclusions

As illustrated in this section, Nordic countries participate in two of the three approved JPIs. This is a particularly important fact, given the strategic relevance of these initiatives at European level.

Based on data from the ERAWATCH Research Inventory, it may be argued that Nordic countries have great potential for contributing to, and even leading, the Agriculture, Food Security and Climate Change JPIs. We have estimated that Norway and Denmark alone accounted for almost one-half of the total 2009 budget for general and specific support measures related to this theme.

With regard to the JPI on healthy food and healthy diet, Nordic countries also have the potential to play an active, albeit less prominent, role. Finland, Sweden, Denmark and Norway accounted for around 20% of the estimated 2009 budget for support measures.

Furthermore, the Nordic countries have the potential to contribute even more if we consider the cross-border initiatives and programmes in place in the region. There are joint Nordic institutions dealing with topics closely related to the fields of the aforementioned JPIs, with extensive experience in cooperative initiatives that could add value to the JPIs, not only in terms of the budget but with regard to framework conditions (e.g. governing structures, institutional and legal barriers, etc.) as well. For instance, the Nordic Joint Committee for Agriculture Research⁵¹ – founded in 1965 and funded by the Nordic Council of Ministers for Fisheries and Aquaculture, Agriculture, Food and Forestry – has a long tradition of supporting research cooperation on sustainable and competitive agriculture and food production in the Nordic area. Meanwhile, the Nordic Council of Ministers for Health and Social Affairs⁵² supports the Nordic School of Public Health, among other initiatives.

⁵¹ See NORDERA Report NO 1 (p. 19).

⁵² See NORDERA Report NO 1 (p. 20).



A-E

G-L

M-R

5. Nordic participation in European Technology Platforms and related Joint Technology Initiatives

While the instruments discussed in previous sections involve public actors in the research and innovation systems, European Technology Platforms (ETPs) were established to strengthen the competitiveness of European industry. Their aim is to provide a framework for stakeholders, led by industry, to agree on a common vision and define strategic research agendas (SRA) in specific sectors.⁵³ The initiative also follows a bottom-up approach in which the stakeholders take the initiative and where the European Commission evaluates and guides the process.

The performance of the ETPs was evaluated in 2008 and most were found to have been successful in bringing the relevant R&D stakeholders together to discuss and agree on long-term research strategies in the selected fields.⁵⁴

There are currently 36 ETPs operating in a wide range of fields, from computing systems to space technology and wind energy. Once the ETP has defined an SRA, the agenda is implemented. Some ETPs are employing an entirely new mechanism: the Joint Technology Initiatives (JTIs). The JTIs were introduced as a means of implementing the SRAs of a limited number of ETPs where the scale and scope of the objectives are so extensive that the loose coordination provided by ETPs and support from regular instruments under the FP are insufficient. A total of five initiatives have been proposed⁵⁵ to become JTIs:⁵⁶

- Innovative Medicines Initiative (IMI)
- Embedded Computing Systems (ARTEMIS)
- Fuel Cells and Hydrogen Initiative (FCH)
- Aeronautics and Air Transport (Clean Sky)
- Nanoelectronics Technologies 2020 (ENIAC)

Given their potential for mobilising resources to transform aspirations into action and their relevance for boosting industrial competitiveness, we have focused our analysis on the fields and initiatives above, with the exception of the Clean Sky and ENIAC initiatives, in which fewer than three Nordic countries are participating.⁵⁷

53 For more details, see the Communication from the Commission (2002) entitled “Industrial Policy in an Enlarged Europe”.

54 “Strengthening the role of European Technology Platforms in addressing Europe’s Grand Societal Challenges”. Report of the ETP Expert Group, October 2009. Directorate-General for Research, European Research Area Knowledge-based economy. EUR 24196 EN.

55 The text of the Seventh Framework Programme proposes six identification criteria for JTIs: scale of the impact on industrial competitiveness and growth; added value of European-level intervention; degree and clarity of definition of the objective and deliverables to be pursued; strength of the financial and resource commitment from industry; importance of the contribution to broader policy objectives including benefit to society; capacity to attract additional national support and leverage current and future industry funding.

56 For more information on the identification process for JTIs, see Commission Staff Working Document (2005), “Report on European Technology Platforms and Joint Technology Initiatives: Fostering Public-Private R&D Partnerships to Boost Europe’s Industrial Competitiveness” (pp. 11-19).

57 As mentioned in Section 1.1, the criterion for defining Nordic participation in a concrete initiative is that at least three Nordic countries are involved.

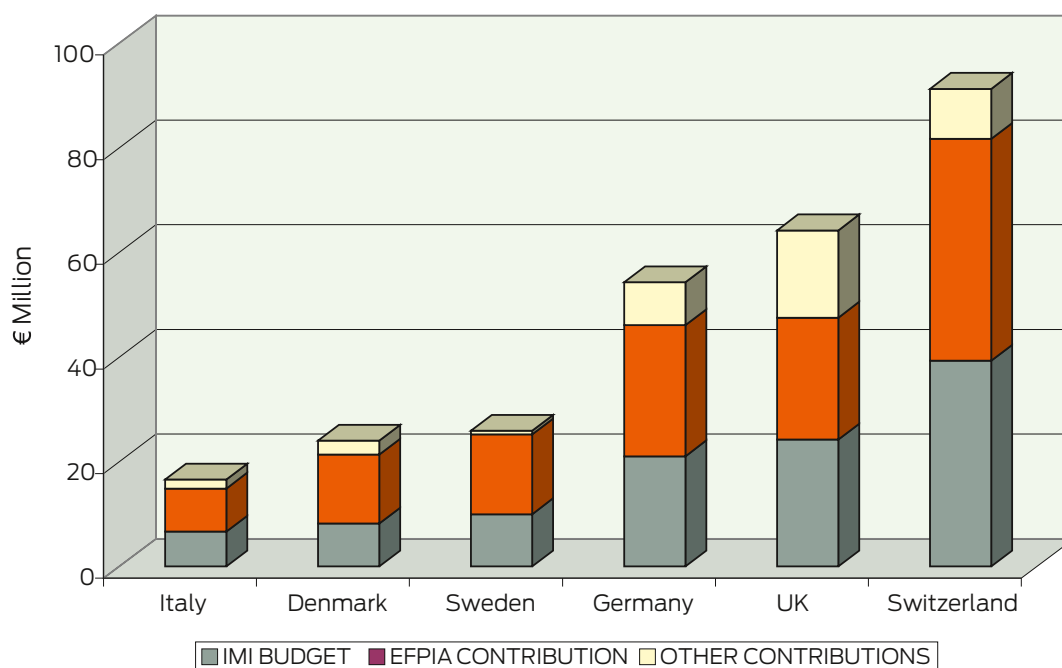
5.1. Innovative Medicines Initiative (IMI)

The Innovative Medicines Initiative (IMI) grew out of the ETP on Innovative Medicines and is led by the pharmaceutical industry. It is a unique, pan-European, public and private sector collaboration between large and small biopharmaceutical and health care companies, regulators, academia and patients. The aim of IMI is to promote the more rapid discovery and development of better medicines for patients and to enhance Europe's competitiveness by ensuring that its biopharmaceutical sector remains a dynamic high-technology sector.

The European Commission and private stakeholders will contribute equally for a total budget of €2 billion for the period 2008-2017. The State Representatives Group is composed of 32 European countries,⁵⁸ including the five Nordic countries. As under the instruments analysed above, most of the Nordic countries are participating via funding agencies (the Danish Agency for Science, Technology and Innovation, Tekes, the Research Council of Norway, and VINNOVA). Only Iceland is participating through a private company.

A total of 15 projects were selected to receive funding under IMI's first joint call in 2008, representing a total investment of €246 million⁵⁹ from the European Commission and the European Federation of Pharmaceutical Industries and Associations (EFPIA). Project costs averaged around €18.78 million. Only six of the participating countries serve as coordinators. As illustrated in Figure 31, Switzerland is clearly the largest contributor, coordinating six projects for a total cost of around €96.76 million.

FIGURE 31. COORDINATION OF PROJECTS FUNDED UNDER IMI 2008 JOINT CALL BY FUNDING SOURCE AND COUNTRY



Source: Based on data available at http://imi.europa.eu/calls-01_en.html

⁵⁸ Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Switzerland, Turkey and UK.

⁵⁹ The second joint call was launched in November 2009, and indicative information on the third call is already available on IMI's website. However, it is still too early to gather information on projects funded under these calls

Three projects are coordinated by Nordic companies (two from Sweden and one from Denmark), for a total of approximately 50 million. This represents almost 20% of the total cost of all funded projects. Although the Nordic countries' role as coordinators is limited, their presence is very important.

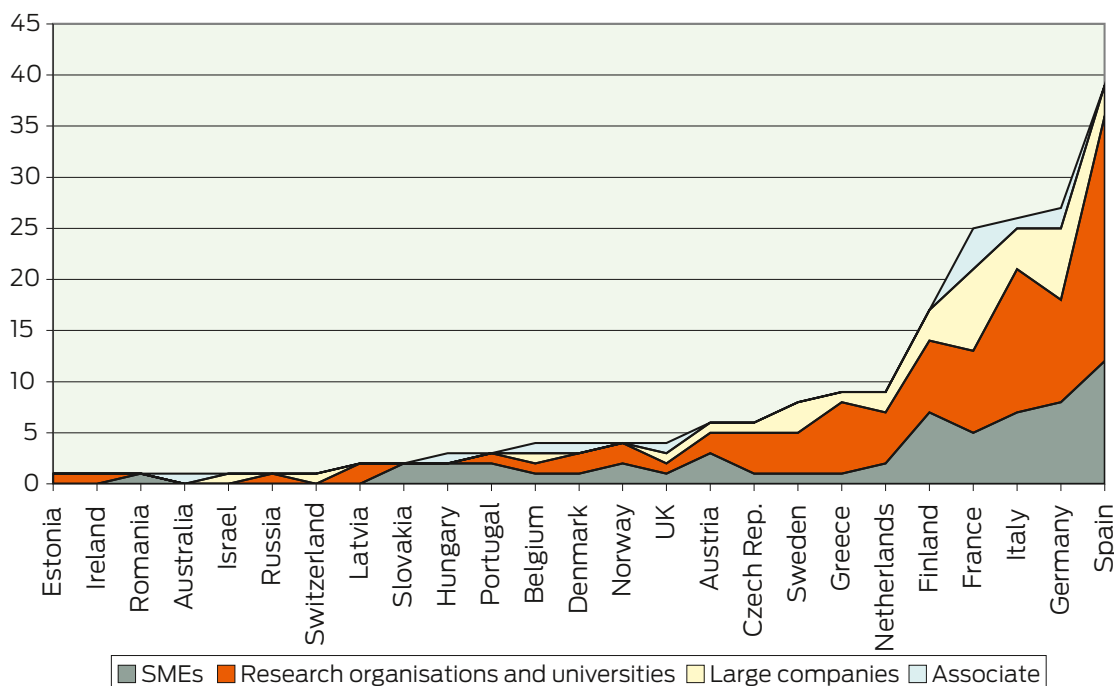
5.2. Embedded Computing Systems (ARTEMIS)

The ARTEMIS-ETP represents the field of Advanced Research and Technology for EMbedded Intelligence and Systems. Launched in 2004, it produced an SRA two years later which defined a vision, mission, goals and strategy for research, technology and innovation in this field and which will serve as a pan-European guideline.

In January 2007, the key members of the ARTEMIS-ETP founded the ARTEMIS Industry Association to take over and continue the activities of the ARTEMIS ETP and to establish a Joint Undertaking to perform R&D in the field as a JTI during the period 2008-2017. The total budget amounts to €2.7 billion, of which 60% is provided by the private sector, 26% by MS and 15% by the European Community.

Around 200 organisations⁶⁰ from 23 European countries⁶¹ and two Third Countries⁶² are participating in this initiative. Figure 32 shows the distribution of the number and type of organisations involved by country. Among the four participating Nordic countries (Iceland is not involved), Finnish organisations are the most prominent (accounting for 10% of the total budget) and are comprised of an equal number of research institutions and SMEs and a smaller number of large companies.

FIGURE 32. TYPE OF ORGANISATIONS INVOLVED IN ARTEMIS BY COUNTRY



Source: Based on data available at <https://www.artemis-ju.eu/>

⁶⁰ 47% are research organisations and universities, 29% are SMEs, 18% are large companies and 6% are associate.

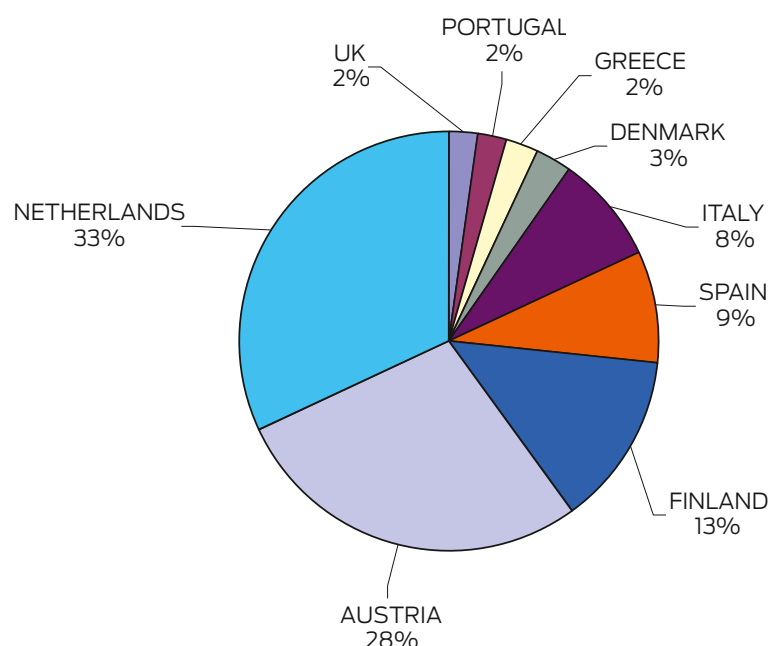
⁶¹ Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Ireland, Latvia, Norway, Portugal, Romania, Slovakia, Spain, Netherlands and UK.

⁶² Australia and Russia.

The ARTEMIS JTI will define and implement a 10-year joint R&D funding programme on embedded systems, issuing an annual call for innovative proposals in the field. Selected projects will be co-funded by the European Commission and the MS that have joined the initiative.

The 2008 call for proposals resulted in 12 projects approved for funding for a total of €112.5 million. The Nordic countries are participating in one-half of the projects. In terms of intensity of the collaboration, Figure 33 shows that around one-third of the total funding is coordinated by the Netherlands and Austria, followed by Finland with around 13%. The rest of the participating countries have marginal participation rates. The two Nordic countries serving as coordinators (Finland and Denmark) together coordinate 16% of the total budget assigned to projects (€15.2 million and €3.29 million, respectively).

FIGURE 33. TOTAL BUDGET COORDINATED THROUGH PROJECTS (2008 CALL) BY COUNTRY



Source: Based on data available at <https://www.artemis-ju.eu/>

5.3. The Fuel Cells and Hydrogen Initiative (FCH)

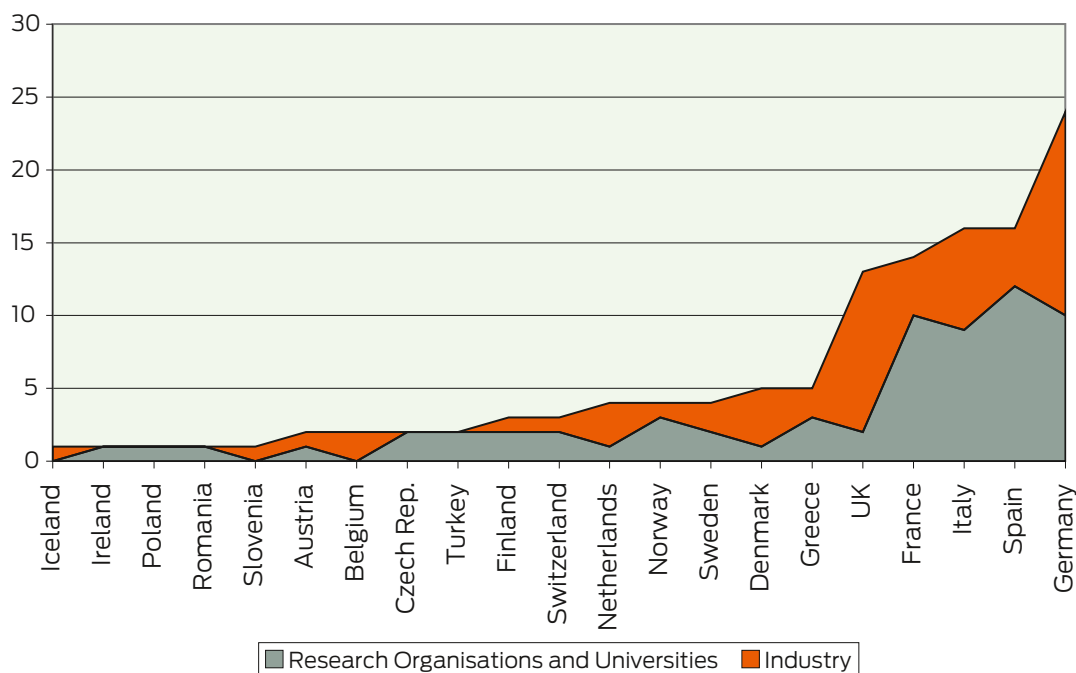
The European Hydrogen and Fuel Cell Technology Platform (FCH) led to extensive cooperation between industry, the scientific community, the public authorities, technology users and civil society in the fields of fuel cell and hydrogen energy technologies. Based on the shared vision (SRA) that emerged from the platform, a JTI spanning a seven-year period was established in 2008.

The Fuel Cells and Hydrogen Initiative (FCH) has a minimum budget of €940 million, one-half of which is provided by the European Community and one-half by the private sector.

More than 120 organisations from 21 European countries,⁶³ including the five Nordic countries, are participating in the initiative. Looking at the Nordic countries individually, organisations in these countries represent less than 5% of the total number of organisations. However, looking at them together, the Nordic region is home to 14% of the organisations involved (see Figure 34).

⁶³ Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Netherlands, Norway, Poland, Romania, Slovenia, Spain, Sweden, Switzerland, Turkey and UK.

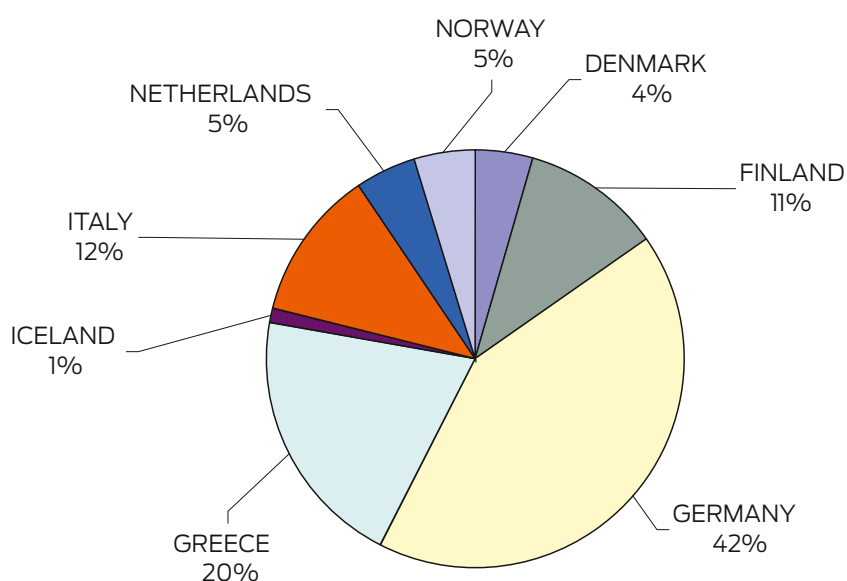
FIGURE 34. TYPE OF ORGANISATIONS INVOLVED IN THE FCH BY COUNTRY



Source: Based on data available at http://ec.europa.eu/research/fch/index_en.cfm

The FCH publishes an annual call for proposals, on the basis of which funding is granted for research, technological development and demonstration projects. The 2008 joint call budget was €27.50 million, which was allocated to a total of 16 projects, with an average of around €1.7 million per project. Nordic countries are participating in about 70% of the projects and coordinating five of them. This represents around 31% of the total projects and 21% of total project funding (see figure 35 below).

FIGURE 35. COORDINATION OF PROJECTS FUNDED UNDER THE FCH 2008 JOINT CALL BY COUNTRY (%)



Source: Based on data available at http://ec.europa.eu/research/fch/index_en.cfm

5.4. Preliminary conclusions

ETPs and related JTIs provide industry with the opportunity to lead initiatives in strategically important sectors in Europe. Out of five ongoing initiatives in five fields, we found Nordic-intensive participation in three fields: medicines, computing systems, and fuel cell and hydrogen energy technologies.

Only Sweden is participating in the JTI in the field of nanotechnologies, while Sweden and Denmark are marginally involved in the JTI in the field of air transport.

The participation of the individual Nordic countries in the IMI, ARTEMIS and FCH initiatives is also quite marginal, Finland, Denmark and Sweden being the most active Nordic countries in these initiatives. In aggregate terms, the Nordic region takes on a coordinating role in an average of 20% of the total projects funded, which represents a modest commitment. However, their capacity for contributing may possibly be higher in specific sectors.

6. Concluding remarks

The focus of this report has been on the scope and intensity of Nordic R&I collaboration in recent policy initiatives at European level involving public sector policy actors (e.g. ministries and funding agencies) at EU and national levels in the formulation of strategic R&D agendas.

The report has analysed Nordic participation in the ERA-NET scheme, Article 169 projects (Article 185 of the Lisbon Treaty), Joint Programming Initiatives, and European Technology Platforms with related Joint Technology Initiatives.

This analysis has encompassed a variety of indicators of participation selected according to the nature of the instrument and the data available. In particular, we have looked at the degree of participation and roles in the networks as well as the funding invested in joint actions (e.g. joint calls). Since certain initiatives are in a very early stage (e.g. JPIs), estimated budgets for national research programmes in JPI-related areas have been also analysed.

Given the voluntary nature of the joint initiatives examined, these indicators have provided good insight into the political commitment of the Nordic countries and the potential of the Nordic region to contribute to joint R&D activities at European level. This section focuses on the main issues raised by the analysis which are of relevance to the future development of the NORIA concept and the JP process.

The main issues are can be summarised as follows:

- The Nordic countries participate in the great majority of the joint initiatives analysed in this report. Under the ERA-NET scheme, Nordic participation is on average slightly higher than the MS average and similar to that of the Mediterranean countries. The Nordic countries are participating in the four active Article 185 projects, leading the initiative focused on the Baltic Sea, which is especially relevant for the development of the Nordic region. Nordic industry and public policy actors participate in three of the five JTIs. Moreover, the estimated budgets of national research programmes show that the Nordic countries have great potential for contributing to the JPIs, particularly in the fields of agriculture, food security and health, thus promoting further integration. Small, but with strong R&D capacity, the Nordic countries as a group have significant potential for playing a leading role, remaining at the forefront of their fields and becoming leaders of joint research actions at European level.
- The analysis of participation in the ERA-NETs in relation to other variables linked to country size in terms of GDP, total population and human resources working in S&T has provided a very similar picture. Small and large countries have distinct patterns of participation in joint R&D initiatives. Obviously, countries the size of Germany or France have more resources and capacity at their disposal and, thus, their participation tends to be higher. In contrast, small countries with more limited capacity could be expected to concentrate their participation in areas of national strength. However, participation based on specialisation is not the only factor underlying the participation pattern of the Nordic countries. These countries are highly specialised in certain fields of national interest, but at the same time they participate in a broader range of networks that are not directly linked to their areas of expertise. This is particularly true for Finland and Sweden. A plausible explanation is that these countries are exploring new areas by joining a large number of international networks and that their internationalisation strategies are at least partially based on the principle of “observe and learn”.

- Looking at R&D intensity we observed that there is, in general, a positive correlation between this variable and participation in international networks. Regardless of their size, the vast majority of European countries follow the same trend. However, data on R&D intensity reveals that, as a group, the Nordic countries (with the exception of Norway) present a distinct pattern that is different from the rest of the European nations, with lower than expected levels of participation for countries with such high R&D intensities. In general terms, the long history of cooperation in R&D and innovation in the Nordic region may partially explain this, with participation in Nordic schemes ‘competing’ with participation in European schemes, but it is difficult to conclude from this analysis that existing Nordic R&I cooperation is a substitute for, rather than a supplement to, collaboration at a wider level.
- Although the analysis has revealed certain fields that appear to be of common interest to the Nordic region as a whole, the individual countries have different approaches to participation at European level stemming from different national strategies and technological profiles. Thus, it cannot be argued that a joint Nordic strategy actually exists. The distinct specialisation profiles of the individual countries as well as their different behaviours in joining networks indicated different participation patterns. Finland has the most intense presence of all of the Nordic countries in all of the instruments analysed. It appears to have a more proactive strategy for international R&D collaboration at European level than the other Nordic countries, and it has taken on leadership roles in fields of national strategic interest (e.g. the area of “well-being” under the AAL initiative, where Finland is one of the largest contributors). Sweden takes a more hybrid approach. While it has joined a large number of initiatives, it does not play a prominent role as coordinator of the joint initiatives. Its strategy seems to be based more on observing and learning. Denmark and Norway play a more modest role, with medium participation rates and almost no presence as coordinators. However, both countries show great potential for contributing to, and even leading, the JPIs in the fields of agriculture, food security and health. Finally, as expected given its small size and population, Iceland has the lowest degree of involvement and generally participates in initiatives in which the other four Nordic countries participate.
- In terms of the actors involved, the Nordic countries participate in EU instruments almost exclusively through national funding agencies. National programme owners (e.g. ministries) are not partners in international networks. The most active organisations are the Danish Agency for Science, Technology and Innovation (Denmark), VINNOVA (Sweden), the Research Council of Norway, and Tekes (Finland). These agencies generally play a very modest role in terms of serving as coordinators of joint projects and networks.
- The Nordic region through its Nordic cross-border institutions was only involved in a small number of initiatives (mainly ERA-NETs). As argued in the first report of the NORDERA project, the Nordic institutional landscape is rather complex and there is little cooperation between the existing bodies of Nordic cooperation. The fragmented institutional structure and the complexity of the system may explain the limited presence of Nordic institutions in European networks. In our view, the increased involvement of Nordic organisations could be a way of strengthening “Nordic added value” in areas that are of strategic importance for the Nordic countries and of integrating the Nordic dimension into the strategic level of European policy. This could also be a way of drawing attention to the Nordic region as an attractive international partner.
- The willingness to allow national funding to cross national borders may be perceived as a strong indicator of support for the development of the ERA. However, data on FP6 ERA-NETs showed that the great majority of joint calls employed the virtual pot model and that the common pot model was only used in approximately 5% of the cases. In this respect, it is interesting to note that the Nordic countries on average allocated a higher proportion of funding via a real common pot than the

Mediterranean countries and large countries. Furthermore, the analysis indicated that a common pot was more frequently used in networks with intense Nordic participation than in networks with no Nordic participation. This may suggest that the Nordic countries have the capacity to exert some influence on funding-related decision-making processes.

Implementing common pot or similar funding agreements in Europe will be contingent on overcoming legal and administrative barriers at national level and building up mutual trust between funding agencies. Although this will be difficult, it is not impossible. The value of the Nordic countries' experience with common pot agreements for an array of projects and co-funded initiatives should be fully recognised. Successful examples in the Nordic region, such as the Top-level Research Initiative (TRI), can serve to encourage the move towards the use of real common pots at EU level. This initiative provides support for cross-border communities, allocating project funding on the basis of competence and excellence rather than national affiliation. The development of the TRI sub-programmes has inspired the Nordic countries' to adapt their research programme portfolios to a certain extent – demonstrating that the real common pot model has the power to influence national research priorities.

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