Final Report

Evaluation of the Scientific and other Tangible Outcomes from the EUROCORES Scheme 2003-2014

3 December 2015

Centre for
Strategy & Evaluation
Services

Contents

Executive Summary

Below we summarize the main conclusions and recommendations contained in the final report prepared by the Centre for Strategy & Evaluation Services LLP (CSES) for the assignment for the European Science Foundation (ESF) 'Evaluation of the EUROCORES scheme'.

1. Resume of study objectives and scope

The purpose of this study was to undertake a summative evaluation of the outcomes achieved by the EUROCORES Initiative at the national and pan-European levels that includes:

- An assessment of adherence to its values in realizing the identified aim;
- A review of the successes, challenges and learning at national level about the management of complex research programmes;
- Identification of good practices in terms of programme design, funding and management;
- Identification and collation of individual programme and EUROCORES scheme outcomes including leveraging of funding/awards for continuing research, establishment of ongoing networks, partnerships and other research groups/infrastructure, breakthrough discoveries and so forth;
- Review of the strategic importance of EUROCORES and its future relevance.

The overall aim of the evaluation was to deliver a final evaluation report on the EUROCORES Scheme which quantified and described the scientific, networking, economic and other tangible outcomes of the EUROCORES Programmes together with their drivers. The outcomes of EUROCORES had not previously been systematically identified or assessed and doing so was the key objective of the evaluation. The scope of the evaluation covered all EUROCORES activities during the period 2003-14.

2. Methodological approach

The assignment was carried out in three phases:

Phase 1: Preparatory tasks - a set-up meeting with the ESF, interviews with ESF staff, desk research, and the finalisation of the methodological approach. These and other elements were presented in an inception report (April 2015);

Phase 2: Survey work, interview programme and case studies – further desk research, two surveys (1,876 contacts were contacted with 855 completing a questionnaire), an interview programme with 60 key stakeholders, 10 case studies, and two focus groups (Brussels, Bratislava) leading to an interim report (July 2015);

Phase 3: The evaluation was completed with a detailed analysis of the research findings and preparation of a final report (October 2015).

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3. Main Conclusions from the evaluation of EUROCORES

General conclusions

3.1 From the European research community's perspective, the EUROCORES Scheme filled a genuine need which has not been (sufficiently) filled by any other funding instrument existing today. EUROCORES was unique in promoting an independent, bottom-up approach to collaborative research in Europe that allowed new scientific ideas to be developed. EUROCORES was also important as a forum for developing medium-sized, high quality projects that enabled not only the most experienced researchers to work together but also provided support for the career development of young researchers.

3.2 Although the research community recognises the need for policy-driven research funding, there is a general consensus that the Horizon 2020 and other European or national funding instruments cannot adequately perform the same role as EUROCORES. There are concerns that the closure of the scheme has left a gap that is particularly noticeable for younger researchers, the domain of humanities, curiosity-driven research, and researchers in smaller countries with a strategy of growing their research competence through internationalisation, and/or a combination of these factors.

3.3 The perspective of the majority of policymakers is that the EUROCORES Scheme provided an excellent framework in which to learn to work together, developing a 'variable symmetry' form of cross-border collaboration. However, whilst acknowledging the merits of EUROCORES, following its closure there is a recognition that similar objectives can now only be pursued through other schemes. In our interviews with policymakers, the EUROCORES scheme was often compared with the ERA-Net Programme. In total, eight out of 13 policymakers or former policymakers we interviewed – and not all of them with direct experience of managing both EUROCORES and ERA-Nets – expressed a preference for the ERA-Nets. For these policymakers, it was felt that the ERA-Net is preferable because funding agencies have a direct influence over the research funding process from start (development of calls for proposals) to finish.

As can be seen in Section 3.5 of this report, researchers who participated in EUROCORES did not necessarily agree with this view about the advantages of the ERA-Net programme (e.g. FP7/Horizon 2020 funding was rated by researchers as being much more likely to have produced similar outcomes to EUROCORES than either ERA-Nets or COST). The preference of policymakers reflects a broader trend in European research. The establishment of Science Europe, focusing solely on policy coordination (rather than 'bottom up' science support platforms and services like the ESF), is another example of this trend. Moreover, European research policy is increasingly focusing on cost-effectiveness and the measuring of research impacts. Naturally therefore, funding agencies in Europe are increasingly wary of taking risks in giving their support for (bottom-up) research. However, this evaluation demonstrates that such fears are misplaced; indeed, EUROCORES compares very favourably with top-down instruments in terms of outputs and impacts.

3.4 Following the onset of the financial crisis in 2008, EU Member States faced increasingly severe constraints on public expenditure which proved a key obstacle to the continuing operation of EUROCORES. There was also increased competition between EUROCORES and other collaborative programmes, notably the ERA-Nets. The transition from the FP6 funding to a budget made up of national contributions and a management fee for the ESF for scientific networking and coordination took planning

and sustained efforts to implement, especially given the additional stress of the financial crisis. Moreover, although the idea of a 'common pot' was discussed, there was an unwillingness of some countries to pool their resources. For all these reasons, despite being widely supported in the scientific community, certain European countries, including some large and hence influential ones, were reluctant to continue providing support to EUROCORES.

3.5 Overall, according to our survey of national research funding organisations, there is no consensus on whether it was the right decision to close the EUROCORES scheme. Researchers who had participated in EUROCORES were not asked for their views on this question but the feedback from them on related issues from the survey and interviews suggests that they disagreed strongly with the decision to terminate EUROCORES. More generally, because of its 'bottom-up' character and funding structure, EUROCORES was a complex instrument that required support from many actors/funding agencies which all had their own individual procedures and priorities to follow in addition to the Scheme rules. Indeed, it took sustained efforts over a long period of time to establish the EUROCORES scheme as a functioning programme. This complexity created a number of challenges – some of which were more or less pertinent depending on the country and domain – but which appears not to have been overcome, despite the efforts of those involved to find a consensus.

Conclusions at the operational level

3.6 Judging by the feedback from our research, the ESF's management of the EUROCORES scheme was held in high regard. The EUROCORES coordinators, science officers and administrators played a key role in the success of the programmes. The investment in recruiting highly-skilled staff with relevant scientific backgrounds was a decision made by the ESF at an early stage in the scheme and the advantages of this approach have been widely recognised by researchers and policymakers alike. Overall, the ESF is considered to have been a good managing agency.

3.7 Although the EUROCORES scheme was not an exclusively 'bottom up' programme, it provided an efficient mechanism for promoting scientist-driven collaborative research priorities. Themes and projects were generated by the research community and selected if they were of high scientific quality and if they were of interest to the funding agencies financing the research. This had two consequences: firstly, a funding agency could – even at a very advanced stage of the proposal – veto one or more projects which then risked the whole theme/programme being stopped or fundamentally restructured; and, secondly, EUROCORES risked not funding projects of the highest quality. Nevertheless, despite considerable flaws in the funding structure, which had an impact on the selection process, EUROCORES was an effective vehicle for funding projects that entailed a high degree of collaboration across countries and disciplines. The networking aspect supported by the ESF was crucial in this regard.

3.8 Overall, and as also argued in the evaluation of the FP6-supported phase of the EUROCORES Scheme, participation in the activities supported after 2008 led to research that was innovative and of significant scientific value. Evidence to support this comes from, amongst other things, the many citations, academic publications, conference papers and other outcomes promoting new theories, new data sets and increased researcher standing in the various scientific domains. Although quantifying the research outcomes cannot be done precisely, assuming that the sample of 12 programme examined by us in detail is representative of the EUROCORES scheme as a whole, this would mean that **during the 2008-**

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15 period EUROCORES supported the activities of over 2,500 researchers across Europe, leading to over 8,000 publications and other scientific outputs and a total of 564 networking events. In addition to the important scientific achievements, our survey findings indicate that over one-fifth of EUROCORES projects (21.7%) led to a breakthrough research discovery. In addition, EUROCORES supported the development of new physical research facilities/centres in Europe. The Scheme was also successful in enabling the industrial application of research through new product licences, spin-out ventures, and patents.

3.9 From a research perspective, the outcomes of the EUROCORES programmes and projects were generally very positive. The EUROCORES themes were highly relevant to the research community. The Scheme was also considered to be of high quality and to be inclusive (as opposed to focusing on the excellence demonstrated by a small number of researchers). Moreover, EUROCORES was designed to suit the needs of all kinds of researchers (theoretical/experimental) and to include all research domains. One consequence of this was the strong involvement by researchers who were at an early stage of their careers.

3.10 EUROCORES contributed to developing a number of new research fields and networks. Many EUROCORES programmes appear to have successfully developed new research initiatives and in at least one case, an entirely new field of research in Europe (the history of Information Technology). Equally, the scheme was effective in stimulating the formation of new research groups that continued to work together successfully after the funding period and to produce a high number of publications and other tangible scientific outputs. As already noted, EUROCORES was a particularly useful vehicle for supporting younger researchers and there appears to have been a high level of success in developing networks of young researchers across Europe in promising new fields of research.

3.11 As was also the case with the earlier (Technopolis) evaluation of the FP6-supported EUROCORES scheme, this study also found strong evidence of additionality (added value), i.e. without the support of the scheme, most projects would not have been able to go ahead, at least on the same scale and with the same partners. At the time when EUROCORES was launched, there were no real alternatives to EUROCORES with regard to funding 'bottom-up' cross-border collaborative research. This remains the case. Whilst the transnational dimension was clearly central to the scheme and the outcomes it achieved, the inter-disciplinary aspect of EUROCORES, whilst not critical, was nevertheless also a significant additional feature.

3.12 In addition to the scientific achievements of EUROCORES, the scheme pioneered methods of promoting cross-border collaborative research in Europe that are or are likely to be of benefit to other schemes. By its very nature, the funding and management of international research projects involving partners from different countries is complex. It involves striking a balance between purely scientific considerations and the interests and priorities of European countries' funding agencies. Three-quarters of the surveyed policymakers agreed that EUROCORES was effective in promoting cooperation between Europe's national funding agencies, a core EUROCORES objective. EUROCORES developed a system that, despite its imperfections, succeeded in balancing these interests in an efficient and effective way, and there are many lessons to be learnt that apply more generally.

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3.13 The closure of EUROCORES has left a considerable gap. The EU-managed Framework Programme, ERA-Nets, the ERC, COST Actions, national programmes, and other funding instruments are not seen in the assessment undertaken by Science Europe (covering Life, Environmental and Geo sciences only) or this study, as being able to fill this void. Some policy makers have a different view but only 21% of surveyed EUROCORES researchers believed their projects would have achieved the same research outcomes under another European funding programme. When EUROCORES participants were asked whether other European instruments such as ERA-Nets, COST and FP7/Horizon 2020 would have led to similar outcomes, these collaborative instruments were not rated strongly. FP7/Horizon 2020 funding was rated as being much more likely to have produced similar outcomes to EUROCORES than either ERA-Nets or COST. The survey results for this study confirm that the research community have a different perspective to some policy makers[1] on the how well other collaborative instruments compare with EUROCORES.

4. Lessons to be Learnt & Future Options

4.1 There are a number of lessons to be learnt from the evaluation of EUROCORES that is relevant to future collaborative research activities in Europe. Any attempts to set up a new version of EUROCORES (or to modify an existing scheme to include its key characteristics) would benefit from the following lessons:

Lessons to be learnt from EUROCORES

- EUROCORES calls for themes and calls for proposals were developed and written by recognised researchers working in the various field(s) covered by the scheme. This attracted other good researchers who recognised the high level of scientific knowledge behind the call.
- The ESF provided highly competent science officers to support research teams and to encourage inter-disciplinarity and collaboration. This was another competitive advantage of the scheme and which appeared to attract high-quality researchers.
- EUROCORES provided flexible grant conditions and opportunities for research collaboration. This seemed to have been particularly helpful in aiding established researchers to foster the younger generation.
- Any future scheme must ensure that it has the long-term commitment required from participating funding agencies with respect to financial commitments as well as a common understanding of the role of bottom-up research. Judging by the EUROCORES experience, a 'common pot' approach (ideally involving an EU funding mechanism) is a prerequisite for a sustainable 'bottom up' scheme. This would eliminate the difficulties encountered in seeking financial commitments on a programme-by-programme and country-by-country basis.
- The time between applications and grant decisions needs to be shorter – the EUROCORES

[1] The policy maker questionnaire did not ask this question. A third of the policy makers interviewed (see Appendix A) expressed this view.

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grant application procedure was scientifically well regarded but slow. Because of delays at national level, it could take up to 18 months between the submission of a grant application and the start of a successful proposal. A 'common pot' type arrangement which is not dependent on Member Organisations' individual legal rules, administrative cycles and financial procedures would be more efficient. A 'virtual pot' arrangement may have merit and could help overcome some of the funding agency boundary/border issues.

- Relating to the last two points, any future scheme needs to solve the issue of a risk of funding lower ranked bids rather than high-ranking ones as a consequence of individual national funding agencies changing their minds about the desirability of supporting particular bids for reasons unconnected to their quality.

Future options

4.2 This evaluation suggests that the rationale for EUROCORES – promoting a bottom-up approach to collaborative research funding – is still highly relevant. The contributions made by the ERC, ERA-Nets, the Marie Skłodowska-Curie actions and other initiatives, to foster high quality research (although not necessarily 'pure' bottom-up research) in Europe are of course important. But as the recent Science Europe gap analysis on international collaboration opportunities for Life, Environmental and Geo Sciences researchers concluded, notwithstanding the existence of other schemes, there is a lack of support to promote 'bottom-up' research (at least in these fields). We agree with this conclusion in relation to the wider areas of research that were covered by the EUROCORES scheme. In short, although EUROCORES has come to an end, there is a strong case for steps to be taken to ensure that a similar instrument is available in the future to promote European level researcher-driven science. The question is how this can be best achieved.

4.3 Based on the evaluation findings and focus group discussions with policymakers and researchers, the report considers a number of options for possible ways forward in funding 'bottom-up' collaborative research in Europe. The various options were discussed at two focus groups attended by representatives from Science Europe and funding agencies from Austria, Belgium, Hungary and Slovakia. The focus groups were organised towards the end of the evaluation and while not representative, provided an opportunity for the three possible options identified to be discussed. The three options we examined are:

- *Option 1* - Accepting the situation as it now stands post-EUROCORES;
- *Option 2* - Modifying an existing EU-funded instrument so that it includes the characteristics of a EUROCORES call;
- *Option 3* - Establishing an entirely new scheme that would be funded by EU Member States.

Options 2 and 3 both involve replacing EUROCORES with a successor scheme that would continue to support bottom-up collaborative research in Europe. However, whereas under Option 2 this would be done within the framework of an existing (EU-funded) programme, Option 3 assumes that it would not be possible to adjust an existing programme and that funding for a new scheme would therefore almost

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certainly have to come from Member States (but ideally made available via a 'common pot'). In both the case of Option 2 and Option 3, the function of administering a new scheme could be contracted out.

4.4 The report evaluates the advantages and drawbacks of the various options. It concludes whilst the third option has advantages in leading to a scheme that would most closely replicate the best features of EUROCORES, it is questionable whether there is sufficient support to do this. Outside a centrally-funded EU-level programme structure, it would be up to the (soon to be) former Member Organisations of the ESF to revisit the question of reopening a EUROCORES-like scheme and to decide on the most appropriate managing agent. This evaluation's findings indicate that most of them seem to be resigned to the fact that EUROCORES is now permanently closed. Overall, therefore, whilst Option 3 would be the ideal, given the likely lukewarm policy backing for this approach, Option 2 should be treated as a fall-back course of action that may have a better chance of succeeding.

In any new scheme, whether under Option 2 or Option 3, the ESF would be in a strong position to be the managing agent. The ESF possesses the experience and know-how of managing EUROCORES and managing scientific schemes is one of the core service areas for the successor organisation. The ESF could provide a good quality support structure in a cost-effective manner that could be linked to a funding mechanism. It may be, however, that political sensitivities outweigh other considerations and preclude consideration of ESF as a managing agent.

1. Introduction

This document contains the final report prepared by the Centre for Strategy & Evaluation Services LLP (CSES) for the assignment for the European Science Foundation (ESF) 'Evaluation of the EUROCORES scheme'. The evaluation was carried out in 2015.

1.1 Resume of Study Objectives and Scope

The purpose of this study was to undertake a summative evaluation of the outcomes achieved by the EUROCORES Initiative at the national and pan-European levels that included:

- An assessment of adherence to its values in realizing the identified aim;
- A review of the successes, challenges and learning at national level about the management of complex research programmes;
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The overall aim of the evaluation was to deliver a final evaluation report on the EUROCORES Scheme which quantified and described the scientific, networking, economic and other tangible outcomes of the EUROCORES Programmes together with their drivers. The outcomes of EUROCORES had not previously been systematically identified or assessed and doing so was the key objective of the evaluation.

The scope of the evaluation covered all EUROCORES activities during the period 2003-14. A number of key tasks were defined in the terms of reference. In summary, the research was to include: a review and meta-analysis of EUROCORES documentation (including previous evaluations at scheme and programme level); a survey of Principal Investigators and Project Leaders of Completed EUROCORES programmes (a minimum response rate of 60% and ideally over 70% was expected); consultation with current and former EUROCORES Management Committee members; and consultation with participating member (funding) organisations. In Section 2 of the report we explain how we tackled the various tasks that were required for this evaluation.

1.2 Structure of the Final Report

The final report is structured as follows:

- **Section 2: Background and Evaluation Framework -** this section outlines the overall context and background to the evaluation. Firstly, we discuss the wider scene with regard to cross-border research collaboration in Europe. We also describe key features of EUROCORES itself. The evaluation framework and the key research undertaken for the study are then described.
- **Section 3: Assessment of EUROCORES Performance -** contains the main results from the evaluation, i.e. an assessment of how well the EUROCORES Scheme performed in relation to its objectives and the outcomes that were achieved.

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- **Section 4: Key Evaluation Issues -** in this section we provide an assessment of key evaluation issues – i.e. more general questions that should be examined in any programme evaluation relating to relevance, effectiveness, efficiency, impacts and added value.
- **Section 5: Conclusions and Recommendations** - presents the overall conclusions from the research and recommendations for the future.

The report also includes a number of appendices: Appendix A lists the interviews undertaken for the evaluation. Appendix B contains a number of supporting tables. Appendix C provides summaries of the focus groups ion Bratislava and Brussels. Case studies are contained in Appendix D and the full set of survey data is contained in Appendix E. The Case studies are listed below and they appear in this order in Appendix D:

- Case Study 1: CNCC
- Case Study 2: ECT
- Case Study 3: EuroDEEP
- Case Study 4: EuroEPINOMICS
- Case Study 5: EUROGraphene
- Case Study 6: EuroHESC
- Case Study 7: EuroSolarFuels
- Case Study 8: OMLL
- Case Study 9: SONS II
- Case Study 10: HumVIB

2. Background & Evaluation Framework

In this section we examine the context of the evaluation – the wider scene with regard to cross-border research collaboration in Europe, the rationale for establishing and financing the EUROCORES scheme, and key features of the scheme itself. The second part of this section sets out the evaluation framework for this study.

2.1 Background - the European Research Area and EUROCORES

This background section mainly draws on existing literature. It is structured as follows:

- **Section 2.1.1** presents an overview of the national research systems in Europe, focusing on how national systems on a general level have approached and incorporated the key objectives of the EUROCORES scheme (internationalisation, inter-disciplinarity, and 'bottom-up' research) into their policy and funding strategies.
- **Section 2.1.2** examines developments and characteristics at the European level in research collaboration, both in terms of the evolution of policy priorities as well as in terms of funding portfolios.

One of the aims of the evaluation set out in the ESF's terms of reference was to 'locate EUROCORES in its EU/global research policy context and to analyse its rationale (past and future).' An important purpose of the evaluation was to examine the extent to which the rationale for the scheme was justified and why this remains, or is no longer, the case.

The EUROCORES Scheme provided one of the first opportunities for national funding agencies to work together in supporting international, 'bottom-up' research. It has been pointed that the concept of research collaboration is (generally) "ill-defined"[2] and can be expressed differently depending on specific contexts and at which level (individual, institutional, international) the research is carried out. Research collaboration in the context of this study is defined as project-based institutional level cooperation which sees groups of researchers working together to achieve a set of common goals. However, it should also be made clear that, as part of this evaluation, the nature of, and impact, of collaboration between policy makers responsible for research, as undertaken as part of the EUROCORES scheme or indeed the ERA-Net programmes, is also relevant.

Within the context of this study, **internationalisation i**s relevant in two ways: firstly, in the context of cross-border or international collaboration between researchers and research institutions, as facilitated through the EUROCORES Scheme; and secondly, internationalisation can also refer to national level cross-border activity, i.e. coordination activities undertaken at policy to facilitate internationalisation of research.

[2] Katz and Martin (1997) What is research collaboration? Published in Research Policy 26 (1997) 1-18. Available at http://users.sussex.ac.uk/~sylvank/pubs/Res_col9.pdf

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'Multi-disciplinarity' is another common term, which is ubiquitously used but can mean different things in different contexts. It is often used interchangeably with related concepts such as 'inter-disciplinarity' and 'trans-disciplinarity' although these are different concepts (also with differing definitions[3]). In this report we use the terms 'multi- or interdisciplinary' (as both are used by ESF when referring to EUROCORES).

2.1.1 National research systems in Europe

Most European countries prioritise support for research and innovation (R&I) and in the last 15 years or so there has also been a general push for an enhanced role of R&I in national and regional policies. At the EU level, there has been an emphasis on this since the signing of the Lisbon Treaty and the subsequent creation of the European Research Area. These developments have of course primarily affected the countries that are EU Member States although collaboration with Associated Countries means that developments within the EU also involve neighbouring European countries.

Research funding and research collaboration also has a regional dimension. Within the panoramic development of the ERA there are several regional research areas with long standing traditions in cooperation, such as the Nordic collaboration set up under the Nordic Council of Ministers (Nordforsk). Another example is the German-speaking countries which also have a closer relationship through bi- and multi-lateral agreements.

Although the European Commission and Member States have shared competence in the RTD and space fields[4], the exercise of the EU's competence in these areas does not limit the competence of the Member States.[5] It means that the Member States may equally take their own action irrespective of whether the EU has acted in the same field too. This is an unusual arrangement which gives the EU less influence compared to other shared competence policy areas. Nevertheless, through the EU RTD Framework Programmes and other programmes to promote research mobility such as Marie-Curie, the EU is able to have a structuring effect.

National R&I strategies are also growing in importance. In 2013-14, all EU Member States – with the exception of Portugal – adopted a national strategy for R&I (Italy, Malta, Romania and Slovakia adopted their R&I strategy only in the last year).[6] National strategies for supporting R&I vary in their duration and generally do not look further into the future than the next 5-10 years. According to the OECD, among the European countries, only the UK's strategy ('Innovation and Research Strategy for Growth') has an open timeframe. Generally, the European countries – in particular the smaller countries – have defined their national strategies in the framework of the EU's Horizon 2020 framework.[7]

[3] One scientific article, concerned with health research, health research and education simply distinguishes the three concepts in the following manner: "multidisciplinarity draws on knowledge from different disciplines but stays within their boundaries; interdisciplinarity analyzes, synthesizes and harmonizes links between disciplines into a coordinated and coherent whole; transdisciplinarity integrates the natural, social and health sciences in a humanities context, and transcends their traditional boundaries." (Choi BC1, Pak AW, Multidisciplinarity, interdisciplinarity and transdisciplinarity in health research, services, education and policy: 1. Definitions, objectives, and evidence of effectiveness. Clin Invest Med. 2006 Dec; 29(6):351-64).

[4] Article 4 of the TFEU

[5] Paragraph 3 of Article 4 of the TFEU

[6] ERA Progress Report 2014

[7] OECD STI Outlook 2014

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Despite the EU Member States (and European countries more generally) working towards a greater or at least more defined role for R&I, there are significant differences in national research capacity. Across the EU Member States, there are considerable differences in the amount and proportion of public funding which is allocated to research. In terms of Government expenditure on R&D, the average GBAORD in Europe (2004-13) is 1.29% of GDP. Norway has the highest average (2.24%). Switzerland's expenditure is also relatively high although because there is a break in the data series, an average cannot be precisely calculated. Bulgaria, Cyprus, Greece, Hungary, Latvia, Malta, Poland[8], Romania, and Slovakia have spent less than 1% of their public funding on R&D. However, measuring only the inputs does not provide a full picture. Notably, the UK often argues that the relatively low spending on R&D (GBAORD averaging 1.35%), while maintaining a strong science base with high outputs, is evidence that the UK system is efficient.[9]

National governments also allocate research funding in different ways. While competitive project-based funding is used in most European countries, the extent to which this allocation method is used varies significantly.[10]

European countries are different in the way they prioritise research, how much they spend on it, and what strengths and weaknesses their national systems have. Germany and the UK are the two biggest beneficiary countries in terms of winning funding from the European Commission budget for research and innovation. During the period 2007-12, the UK received nearly EUR 4 billion in funding (equivalent to a 14.9% share of the total expenditure from the EU budget for R&D).[11] Smaller and medium sized countries often struggle to compete with larger European countries, something which is evidenced by the success and participation rates in EU research programmes, and of course, in the total amount of funding a country is able to obtain from EU sources. Indeed, one of the findings of this evaluation is that, generally, researchers and policymakers from smaller and medium sized countries perceive that there are larger additional benefits from collaboration through EUROCORES compared to the larger countries.

The current R&I system in the 'newer' EU Member States[12] has been in place for less than 25 years. Although it needs to be emphasised that they perform differently as a group, overall the 'newer' EU Member States are similar to each other in that their participation in competitive international programmes are much lower compared to the 'older' European countries. In the case of Social Sciences and Humanities funded under the Seventh Framework Programme, the 'newer' Member States'[13] participation is no more than half compared to the older Member States.[14] These comparably lower rates stem from both economic as well as broader institutional factors:

[8] Data is not available for all years.
[9] We have appended to this report illustrations that show total national spending on R&D (Gross domestic expenditure on R&D, GERD) and total government spending on R&D as a percentage of total general government expenditure (GBAORD).
[10] ERA Progress Report 2014
[11] http://www.rcuk.ac.uk/media/news/121114/
[12] Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia
[13] Thirteen countries in total.
[14] Titarenko and Kovalenko (2014) Analysis of participation of new EU Member States ("EU-13") in FP7 in the area of Socio-economic Sciences and Humanities (SSH)

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- **Firstly, lower research budgets and less expenditure on research personnel and infrastructure.** Research personnel in the 'newer' Member States make up just over one-tenth of the EU overall. Perhaps a crude economic indicator, but the EU countries with the highest success rates in European Framework Programmes spend more than EUR100, 000 per 1,000 researchers per year.
- **Secondly, a lack of experience and influence.** Although smaller countries can of course produce eminent researchers, their researchers tend to lack the experience and capabilities of coordinating pan-European projects. This tendency is linked to smaller research budgets. With this also follows that they are less able to attract fellow country researchers and consequently gain more competitive funding. Smaller countries are less influential in the lobbying corridors of Brussels and thus less likely to input and guide funding and policy decisions.[15]

The EUROCORES scheme has also followed a pattern of uneven participation. The five larger European countries have the highest levels of participation in the EUROCORES programmes (in each case participating in between 60 and 80% of the programmes) Medium-sized countries (in terms of the percentage of public funding spent on R&I) also had relatively high levels of EUROCORES participation, including Austria and Belgium (over 50% participation), the Netherlands (68%) and Switzerland (60%). Three European countries have never participated in EUROCORES.[16] Malta and Latvia which were not Member Organisations of the ESF, and Lithuania.

2.1.2 Research collaboration

It is generally argued that the pooling of resources is the most efficient way of solving common challenges. Internationalisation and international collaboration in research not only enhances intellectual and cultural diversity, but also allows countries' national research systems to specialise in that they do best. One of the most significant developments in research funding is the increased importance and means of international collaboration.[17] That said, research and research management is a key national policy. In 2011, 85% of publicly-funded research in the EU was undertaken at national level with the remaining 15% coordinated either through intergovernmental organisations or spent jointly through the EU's Research Framework Programme.[18]

[15] Titarenko and Kovalenko (2014) Analysis of participation of new EU Member States ("EU-13") in FP7 in the area of Socio-economic Sciences and Humanities (SSH)
[16] Our analysis based on EUROCORES data
[17] Jacob Background document Research funding instruments and modalities: Implication for developing countries Draft report Research Policy Institute Lund University Sweden
[18] LERU. Advice Paper No.9, 'The European Research Area: Priorities for Research Universities', December 2011. LERU response to the European Commission Consultation: "The European Research Area Framework, Untapped areas of potential"

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There are however other perspectives on this issue. A recent Science Europe Opinion Paper, produced on behalf of their Member Organizations, argues that European figures underestimate the real level of research co-ordination in Europe. The paper argues that the data are misleading as they include university and research institutional block spending as 'funding which risks fragmentation of resources'. This disregards the possible use of these funds as a strategic part of collaborative efforts at institutional level. Moreover, Science Europe's analysis leads to the conclusion that fragmentation is not a widespread issue. On the contrary, the analysis finds several reasons for supporting multiple research teams, including the importance of reproducibility of research results, the role of competition between research teams, and the importance of local knowledge networks and the need for place-specific research.[19]

Seen from a global perspective, the internationalisation of research is growing and the added value of collaboration internationally in research is becoming increasingly apparent. According to research supported by the publisher Elsevier 'numerous studies have shown that research outputs that represent collaborations – particularly international collaboration – have a higher citation impact than those that do not'.[20] International collaboration can also foster the development of technological capabilities and innovations.[21] Globally, inter-country collaboration rates stood at 17% in 2011 (up from 14% in 2003)[22]. The Elsevier report suggests that in 'both Europe and the US, there is a tendency for inter-institutional collaboration to increase at the expense of single author and single institution publications' [23] and on average (across disciplines). The nature of research collaboration is also changing, from a bi- or multi-lateral approach which often tended to exclusively focus on the research community and on mobility from middle- and low-income countries to high-income countries, to international collaboration including cooperation among research funders.[24]

The latest ERA progress report suggest that 13 countries dedicate a higher share of funding to joint R&D agendas with other EU countries than the EU average (see Figure 2.1 below).

[19] Science Europe Position Statement On the Role and Future of Joint Programming August 2015

[20] See Comparative Benchmarking of European and US Research Collaboration and Researcher Mobility: A report prepared in collaboration between Science Europe and Elsevier's SciVal Analytics, September 2013.

[21] Penner-Hahn and Shaver (2004) Does international research and development increase patent output? An analysis of Japanese pharmaceutical firms. Strategic Management Journal. Volume 26, Issue 2, pages 121–140, February 2005

[22] Comparative Benchmarking of European and US Research Collaboration and Researcher Mobility: A report prepared in collaboration between Science Europe and Elsevier's SciVal Analytics, September 2013

[23] Comparative Benchmarking of European and US Research Collaboration and Researcher Mobility: A report prepared in collaboration between Science Europe and Elsevier's SciVal Analytics, September 2013

[24] Jacob Background document Research funding instruments and modalities: Implication for developing countries Draft report Research Policy Institute Lund University Sweden

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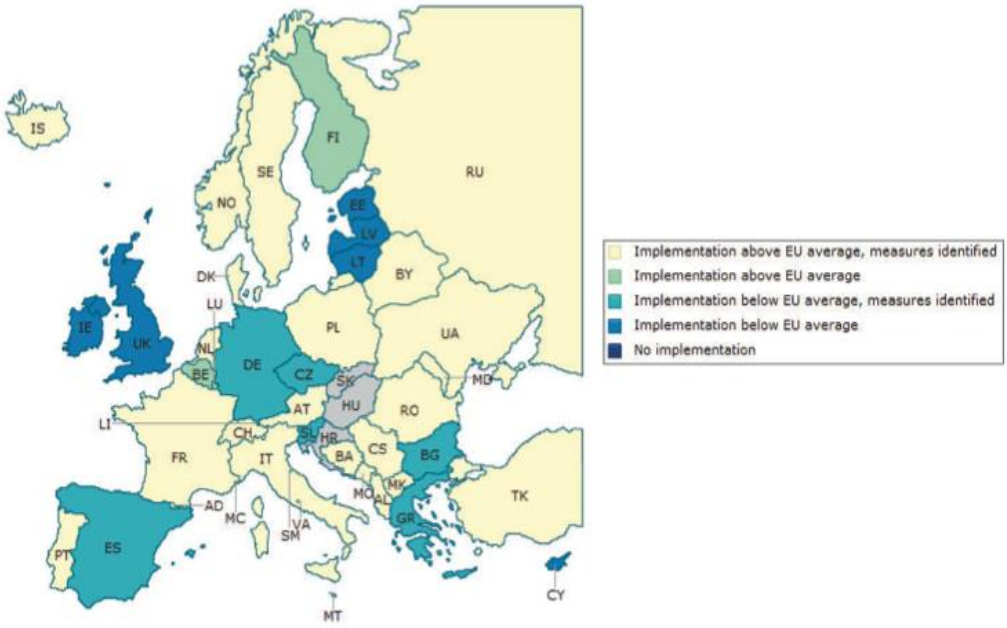
Figure 2.1: Classification of EU Member States according to the measures in support of the implementation of joint research agendas and financial support provided by funders, 2013



Source: taken from the ERA Progress Report 2014

As can be seen from the above chart, In 15 EU Member States the share of budgets dedicated to joint research agendas is below the EU average or non-existent: in Bulgaria, the Czech Republic, Germany, Greece, Spain and Slovenia spending is below average; in Cyprus, Estonia, Ireland, Lithuania, Latvia, the UK no explicit measure or strategy appears in place, while there is no support dedicated in Croatia, Hungary or Slovakia.[25]

With regard to international cooperation, 19 out of 28 EU Member States allocate specific funds to international research collaboration with six countries allocating more than 2.4% of their funding. However, countries can earmark international collaborative funding without deploying specific policy support – only Germany, Denmark, France, the Netherlands and the UK specify policy support for international cooperation. Bulgaria, Croatia, Cyprus, Estonia, Hungary, Ireland, Luxembourg, Malta and Slovakia have no budget allocated to international cooperation.[26]

[25] ERA Progress Report 2014
[26] Ibid.

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In addition to financial support, there are other methods of promoting internationalisation such as encouraging the mobility of researchers. According to the latest ERA Progress Report, just under one-third (31%) of EU researchers (post-PhD) have worked abroad within or outside of Europe, "as researchers for more than three months at least once during the last decade". [27] Although difficulties can arise when working abroad, international mobility is largely considered to be a positive factor in developing new research skills.[28, 29]

Cross-border collaboration not only involves researchers working together but increasingly policymakers are also working more closely together. With increased collaboration, any differences in national processes and systems governing research become more pronounced (e.g. administration of funding periods for research programmes or peer review processes. Peer review is practised in all the EU Member States and although there are a number of criteria that are recognised to be key standards when practising peer review (objectivity, scientific excellence, avoidance of ad hominem attacks) there is no agreed standard approach of how to organise international peer review).[30]

As noted earlier, international collaboration in research is a broad concept as the type and length of interaction varies according to the sciences and actors involved. Some research fields or disciplines are more used to collaborating than others. Collaboration in the humanities field has, for example, been less common compared with medicine or physics.

2.1.3 Different methods of research funding

As a result of the economic crisis and cutbacks in public funding, support for research is increasingly subject to scrutiny and needs to be justified in national budgets. This has amplified the need for selection and priority-setting tools and has led to more strategic science and technology policies being developed.[31]

In the last 20 years, governments in the European countries have instigated reforms to modernise the structure and organisation of public management, not exclusively pertaining to research and innovation, but certainly including RDI. This trend is sometimes referred to as New Public Management (NPM) model for public governance. The NPM model sets a major focus on results and performance in terms of efficiency, effectiveness, accountability, quality of service, and the decentralisation of public management. With regards to research and innovation performance, NPM has meant an expansion of the scope, use and expectations of evaluation. [32] Nationally and internationally, efforts are being made to develop RDI capacity and to align research with societal needs and challenges. For instance, there is a strong focus on tackling societal challenges, such as climate change, health, and energy policy. In some

[27] ERA Progress Report 2014
[28] Ibid.
[29] The ERA Progress report suggests that 80% of internationally mobile researchers felt that the mobility had a positive impact on developing their research skills.
[30] ERA Progress Report 2014
[31] Arnold and Balázs (1998) The Evaluation of Publicly Funded Basic Research
[32] Mahieu et al (2014) Measuring scientific performance for improved policy making Study IP/A/STOA/FWC/2008-096/Lot8/C1/SC13 April 2014

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countries, policy reforms have also altered the management, funding and prioritisation of research and innovation interventions.

There are a number of other funding agencies in Europe which operate a predominantly 'bottom-up' approach that is driven primarily by researchers. For example, the funding programme of the FWF in Austria (Austrian Science Fund) uses a 'bottom up' approach in tandem with peer review.[33] A similar approach is used by the DFG in Germany (German Research Foundation).[34]

Although these data only cover a handful of OECD countries[35], the secondary data collected as part of an international benchmarking exercise for the Norwegian government suggests there is a trend towards a more applied research focus in the work of both universities and government.[36] However, with regard to 'bottom-up' research, i.e. research driven by scientists, this proved more difficult to assess and equally to distinguish a clear pattern although the authors acknowledge difficulties in separating 'bottom-up' allocations from other instruments. Their conclusion is that the proportion of 'bottom-up' research funding varies enormously.

Table 2.1: Proportion of bottom-up research 2010 (European countries only)

Country	Organisation(s)	Total Research Budget Considered	Percentage of 'Free' Research*
Denmark	Danish Council for Independent Research National Research Foundation Strategic Research Council	EUR360m	58%
Finland	Academy of Finland	EUR384m	45%
Netherlands	NWO	EUR327m	33%
Sweden	Swedish Research Council FAS FORMAS	EUR661m	78%
United Kingdom	No data obtained	No data obtained	No data obtained

Note*: this report uses the terminology 'free research' which it equates as a synonym to 'bottom-up.

Source: Data and table adapted from Arnold, Simmonds, Carlberg, Deuten, Giarracca, Melin, Sidiqui (2011) Research Support to the Fagerberg Committee

Although the estimated proportions shown in the table above need to be treated with caution, the debate on funding allocation and to what extent 'bottom-up' research or top-down programmes should be prioritised is on-going. In 2003, the UK Physics community through the Institute of Physics published an open letter to the UK's funding agency Engineering and Physical Sciences Research Council. This expressed a concern about the lack of transparency in the selection process (in terms of feedback) and in the differences between success rates for 'curiosity-driven basic research' and 'managed programmes' (with the former having a success rate of 10-15% and the latter around 30%). The letter asked if "the

[33] http://www.eugris.info/DisplayFunding.asp?f=101
[34] http://www.dfg.de/en/dfg_profile/mission/index.html
[35] Canada, Finland, Denmark, the Netherlands, New Zealand, Sweden and the UK
[36] Arnold, Simmonds, Carlberg, Deuten, Giarracca, Melin, Sidiqui (2011) Research Support to the Fagerberg Committee

recent decline in the success rate of curiosity-driven grant proposals [was] just unfortunate, or part of a deliberate strategy?" Editorial comments made by the journal Nature on the letter suggested that:

> "What is clear is that when it comes to funding science, governments are not interested in providing a pool of money simply for the purposes of satisfying researchers' curiosity. Rather, they like to think in broad strategic terms — which research areas are most likely to lead to future advances in technology and wider societal benefits. This issue is by no means confined to the UK: there is a general trend in Europe and the US for basic research to be directed towards the same areas: nanotechnology, materials for energy and photonics to name a few. Many of these areas are undoubtedly going to be important for the future development of science and technology in the UK. But what many researchers are concerned about is that funding for these managed programs is eating into the funding available for bottom-up blue-sky research. The UK excels in a few key fields — organic semiconductors, photonics and carbon electronics, for example — and these fields are held up by the EPSRC as examples of past success. But by and large, these were unanticipated successes, rather than arising out of a deliberate effort. Meanwhile, the UK is falling further behind in other research areas. This situation will surely not be helped by further concentration of funding in a few 'strategic' programmes." [37]

2.1.4 Multidisciplinary and interdisciplinary research

The EUROCORES scheme strongly encouraged interdisciplinary and multidisciplinary research. The Scheme aimed to 'bring together national research funding organisations and supporting interdisciplinary research in non-traditional areas, thereby opening new horizons in science.'[38] The strong focus on inter-disciplinarity – in the programmes where this was scientifically relevant and applicable – has also been noted by many EUROCORES participants interviewed as part of this evaluation.

The traditional way of approaching research funding and the monitoring and evaluation of research outputs is through scientific disciplines. Funding agencies can be thematic (as in the UK) or – if a single agency is responsible for all sciences (e.g. Norway, Germany) – divided into compartments along with their own earmarked budget for research funding. Seen from a perspective of inter-disciplinarity, set institutional structures risk becoming barriers that separate disciplines and might cause create zero-sum situations; where one department gains financially, another may lose. The OECD suggests that inter-disciplinary research supports convergence in scientific research[39] as new fields of research emerge from traditional disciplines and these develop a (new) mix of approaches using a variety of methods and analytical instruments. The convergence of new fields – nanotechnology, biotechnology, information technology and cognitive sciences – can lead to new industries or existing industries being transformed.[40] Of course, this does not mean that traditional or mono-disciplines cannot achieve the same impact.

The engagement in and impact of multidisciplinary research was recently explored in a quantitative review by the publisher Elsevier which found that interdisciplinary research activity was growing in

[37] Research funding: the problem with priorities. Nature Materials 2, 639 (2003). See http://www.nature.com/nmat/journal/v2/n10/full/nmat992.html
[38] See http://www.esf.org/coordinating-research/eurocores.html
[39] OECD STI Outlook 2014
[40] OECD STI Outlook 2014

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intensity. Although this was an international trend, it was particularly noticeable in BRIC countries, including China and Brazil. Interdisciplinary research was also "associated with a lower citation impact overall, but a higher level of citations in patent applications." [41] Interdisciplinary research collaboration can be especially important when it comes to tackling complex scientific questions, as highly intricate problems may require input and solutions from different disciplines.

Overall, current institutional conditions do not actively motivate researchers to engage in interdisciplinary research. For example, academic recognition is largely based on the achievements in one single scientific field and it is a challenge for funding agencies to put together high-quality interdisciplinary peer review panels. Peer-reviewed publications, impact factors, citation indices, and highly specific subject-related knowledge are used to measure academic excellence. A UK House of Lords report comment on the difficulties faced by (UK) scientists seeking to publish their multidisciplinary research in scientific journals. The same report also points to anecdotal evidence that suggests it is "generally more difficult to get multidisciplinary work published, since the publishing industry is largely discipline-based, and papers in cross-disciplinary journals, are often rated less highly than those in traditional journals. Publishing in newer journals with a multidisciplinary slant is a more risky proposition as these journals may have an as yet unproven citation impact".[42]

Challenges in working together across disciplines also stem from fundamental differences in the views on the role of science and in the approaches used to conduct research. A practical challenge is that languages and the meaning of concepts vary across disciplines (e.g. the word 'mitigation' have different meanings in different scientific disciplines). There are fundamental differences in epistemologies and methods used by social scientists and natural scientists. There are challenges in measuring outputs too. The social sciences and humanities, for example, do not publish as frequently as the natural sciences (the humanities tend to prefer book publications over papers). For the former, it might take up to three years submission of work to a publication and the first citation. In the natural sciences, the equivalent time period can be around one or two years.[43]

Indeed, it has been argued (Becher and Trowler, 2001) that differences between disciplines (and sub-disciplines) are increasingly recognised but that 'theoretical understandings and practical policies cannot be assumed to relate equally to all academic contexts'.[44] Mutz el al in their recent paper exploring 'cross-disciplinary' research in funding proposals, distinguished between three different positions in attitudes towards cross-disciplinary research, although indicating there may be more: (i) there is no problem, i.e. cross-disciplinary research is possible – see for example the EU FET Programme – and 'represents no real problem'; (ii) the science community hinders cross-disciplinary research, i.e. cross-disciplinary research is

[41] Elsevier (2015) A Review of the UK's Interdisciplinary Research using a Citation-based Approach: Report to the UK HE funding bodies and MRC

[42] UK House of Lords Session 2005-06 Publications on the Internet Science and Technology Committee Publications Science and Technology (July 2005).

[43] Peter, Jávorka, Carlberg, Markianidou, Simmonds (2012) Improving the contribution of the Social Sciences (including Humanities) to tackling the Grand Challenges Study to assist the European Research Area Board.

[44] Becher and Trowler (2001) Academic Tribes and Territories Intellectual enquiry and the culture of disciplines SECOND EDITION. The Society for Research into Higher Education & Open University Press

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rare because the "interests of policy in innovation collide with the interests of science in a defined discipline-specific research. In the end, it is science itself that hinders cross-disciplinary research"; and (iii) the policy and funding allocation system hinders cross-disciplinary research. Funding organisations hinder cross-disciplinary research insofar as the funding systems prefers traditional disciplines. This is illustrated by, for example, selection and evaluation procedures as they follow 'rigid hierarchical classification systems'.[45]

2.2 Overview of EU research policy and funding instruments

European research collaboration in its current form dates back to the 1950s and has contributed to the development of the current R&I institutional structure at the European level which began to emerge in the early 1980s. The trajectory of R&I collaboration led by the European Commission has been very closely tied to developments and key trends in EU industrial policy.

2.2.1 Rationale and developments leading to the launch of the EUROCORES scheme

EU-supported collaborative research policy and funding is a policy area where the European added value is generally considered to be high.[46] Several arguments to support its significance have been put forward:

- Firstly, European research funding programmes allow Member States to address key policy challenges together that would be too great for one country to handle individually (e.g. energy security, climate change or an ageing population);
- Secondly, European research funding allows for the pooling of resources in pursuit of research excellence, including blue skies research;
- Thirdly, it prevents the fragmentation or duplication of national research efforts.

Collaboration in research can help develop a more efficient division of labour in research efforts in Europe where the best researchers can work together across borders. Research excellence in specialist areas is typically spread across a number of research institutions in different countries and internationally and the pursuit of world-class science, research and innovation demands a collaborative approach between different countries. In our discussions with scientists who had participated in EUROCORES programmes it was pointed out that international collaboration facilitates economies of scale and that some areas of research can only be tackled in this way. This is especially the case for countries with relatively small research sectors, it was argued.

[45] Mutz el al. (2014) Cross-disciplinary research: What configurations of fields of science are found in grant proposals today? Research Evaluation (2014) pp. 1–7

[46] SEC(2011) 1427 final, Commission Staff Working Paper Impact Assessment Accompanying the Communication from the Commission 'Horizon 2020 - The Framework Programme for Research and Innovation'; Proposal for a Regulation of the European Parliament and of the Council establishing Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020); Proposal for a Council Decision establishing the Specific Programme implementing Horizon 2020 – The Framework Programme for Research and Innovation (2014-2020); Proposal for a Council Regulation on the Research and Training Programme of the European Atomic Energy Community (2014-2018) contributing to the Horizon 2020 – The Framework Programme for Research and Innovation

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Notwithstanding the high potential added value of the promotion and implementation of a common EU research policy, the development, implementation and steering of research policy remains driven by and implemented within a national remit. As highlighted earlier, 85% of publicly funded research in the EU is undertaken at national level.[47] The post-war reconstruction of Europe was not only confined to economic and political terms but also incorporated aspects linked to research. The prevailing view of the scientific community in Europe was to work with policy makers to develop new structures for research that were internationally competitive. Collaboration in the area of research was identified as a means of pooling sufficient resources, "given the costs and the complexity of research infrastructure and the limited economic resources available to set up and maintain them". [48]

These interests led to the establishing of European organisations which formed the foundation for institutional arrangements still in place today. This includes the European Coal and Steel Community (ECSC), and EURATOM. EURATOM's aims largely reflect the aims set out today through the ERA, focusing on avoiding duplication, coordinating national contributions, avoiding gaps in national R&I programmes, standardising processes, and facilitating ideas. EURATOM also conducted and coordinated research. The founding of the European Organisation for Nuclear Research (CERN) – albeit set up as an international bureau by UNESCO – also represented an important element in the general European integration process. Science was a key aspect of the Atomic Energy Community, but – with the exception of agricultural research – did not have a central role in the EEC until the 1970s.[49]

The push towards a more central role for European science collaboration came from the 'technological gap' debate which emerged in the 1960s and which underlined the gap between the US and the Western European countries in terms of the role of technology in economic growth. While Western Europe was seeing exceptional economic growth, in contrast in the US, American technology and organisational innovations were impacting much more strongly on both industries as well as the broader society. In order for the European countries to try to keep up, they needed to change their focus from oil, steel and traditional industries to an emphasis on innovation, the commercialisation of new ideas and their application in new industries. The absence of such an approach led to an underachievement in new and growing fields, above all the ICT industry.[50]

In more recent years, the role of R&I has grown continually in importance and has been embedded in EU-level strategies to promote growth and jobs for the last decade and a half, from the Lisbon strategy onward, up to the Europe 2020 goals and the European Research Area. Over the years, a number of entities have been set up to strengthen R&I:

[47] Comparative Benchmarking of European and US Research Collaboration and Researcher Mobility: A report prepared in collaboration between Science Europe and Elsevier's SciVal Analytics, September 2013.
[48] Guzzetti (1995) A brief history of European Union Research Policy
[49] In July 1963, the EEC Commission made the first of a long series of recommendations to Member States on the subject of strengthening cooperation in the fields of science and technology.
[50] Guzzetti (1995) A brief history of European Union Research Policy

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- The **Joint Research Centres (JRC)** established in 1957 by EURATOM, is today the European Commission's in-house scientific and technical support service. It consists of a network of seven research institutes across the EU.
- The **European Research Council (ERC)** supports 'frontier research' encouraging the best scientists, scholars and engineers to go beyond established frontiers of knowledge and the boundaries of disciplines.
- The **European Institute of Innovation and Technology (EIT),** which aims to translate research results into commercial applications through thematic 'Knowledge and Innovation Communities (KICs).

The implementation of the Lisbon Strategy (2000) was a major milestone as it gave a renewed priority to research and innovation. More recently, the general framework for strengthening and refocusing European international cooperation activities has been outlined in a 2012 Commission Communication[51]. The Communication describes the development of a set of common principles to support international cooperation in the field of research across the EU. This framework is, however, dependent on a closer alignment of research priorities. In addition, there are also bilateral agreements between a number of individual countries which aim to promote common interests, priorities, policy dialogue, and necessary tools for research collaboration.

2.2.2 EU Framework Programmes

The most long-standing – and today the largest – funding programme is the EU's Framework Programme for RTD. Although the First Framework Programme was approved by the Council in 1983 (FP1 ran from 1984-1987 with a budget equivalent to EUR 3.75bn), research activities had previously been funded under the European Treaties since the European Coal and Steel Community (ECSC) in 1955. There have subsequently been seven further multi-annual EU RTD funding programmes.

The First Framework Programme was only loosely linked to policy priorities. It had a relative modest budget. This changed with the introduction of the European Single Act (1987) which provided an obligation by the Treaty to promote industrial competitiveness. As a result, the Framework Programmes became more industry-focused and from the fourth Framework Programme onwards received larger budgets. This had some negative impacts with prominent industry player being seen to have influence at the expense of European scientists (and SMEs).[52] Framework Programmes 5 and 6 began to integrate interdisciplinary approaches.

In tandem with policy trends and developments, another major factor for EU research collaboration has been EU enlargement. The EU research policy agenda was once steered by a relatively small number of Member States but today there are 28, not including a large number of associated countries. This has changed the role of the FP programme committees and also led to changes in the structure and content of the latest Framework Programme as a result of revised articles in the TFEU. Article 185 stipulates that

[51] COM(2012) 497 final
[52] Guzzetti (1995) A brief history of European Union Research Policy

integration (in research) can be done without the consent of all Member States and also facilitates closer coordination between Member States' research activities (scientific, financial and management) with the support of the EU.

Industry collaboration in R&I is also developing new forms, notably through the European Technology Platforms (ETPs). These are self-funded industry-led stakeholder fora that are tasked to develop research at EU and national level. ETPs work to mobilise stakeholders to deliver on agreed priorities and share information across the EU.

The biggest EU funding programme is the Horizon 2020 Programme. Horizon 2020 is the successor to the 7th Framework Programme and runs for the period 2014-2020. It will provide nearly EUR 80 billion of funding over these seven years. A key aim of the Programme is to link research and innovation but equally it aims to facilitate high quality science, industrial leadership and the tackling of societal challenges. Horizon 2020 also incorporates the Future and Emerging Technologies (FET) Flagship, originally developed outside of the Framework programme structures. This type of flagship illustrates a partnering model for long-term EU collaborative research that is in many respects similar to the EUROCORES Scheme.

2.2.3 European Research Area (ERA)

EU Member States are currently working together to promote common R&I goals as part of the European Research Area strategy. The ERA's objective[53] of creating a single market for EU researchers' scientific knowledge and technology is designed ultimately to promote not only scientific and technological excellence but also strengthen the EU's and its Member States' competitiveness and capacity to collectively address 'grand challenges'. The ERA is a non-legislative approach to encouraging cooperation and collaboration as opposed to a regulated structure. Although advancements have been made in achieving the objectives of the ERA, the latest Progress Report (2014) show that progress is uneven across the Member States and between different types of research and funding organisations and that "further implementation efforts are needed".[54] This is notwithstanding the Conclusions of the European Council of 3-4 February 2011 which called for the completion of the ERA by 2014.[55]

[53] The ERA encompasses five key priorities:
1. More effective National Research Systems: open national-level competitions and assessments in order to achieve higher quality research and to derive maximum value from public money invested in research.
2. Optimal transnational co-operation and competition: focusing on an effective division of labour and the tackling of grand challenges. The ERA should facilitate the exploitation of synergies between national and international programmes, strategically aligning different sources of national and other funds at EU level rather than cross-border funding per se.
3. An open labour market for researchers: focusing on mobility of researchers to facilitate a genuinely European research labour market. This will enquire increased transparency and merit-based recruitment.
4. Gender equality and gender mainstreaming in research: Strengthening European research by supporting women in research and science, who are often inefficiently deployed in the field.
5. Optimal circulation and transfer of scientific knowledge: focusing on Open Access policies, access to and preservation of scientific information. See: http://ec.europa.eu/research/era/index_en.htm

[54] COM(2014) 575 final. Communication from the Commission to the Council and the European Parliament European Research Area Progress Report 2014.

[55] EUCO 2/11. See http://register.consilium.europa.eu/doc/srv?l=EN&f=ST%202%202011%20INIT

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The European Commission uses a combination of programmatic and other financial and policy instruments to implement ERA policies. As mentioned earlier, it has also put in place institutional structures, the European Research Council and other institutions and initiatives, e.g. the European Strategy Forum on Research Infrastructures (ESFRI), which is an instrument "to develop the scientific integration of Europe and to strengthen its international outreach"[56]. Through the Framework Programmes and other EU programmes, the EU promotes the structuring of research across the EU and the Marie-Curie programme plays an especially significant role in promoting the free movement of researchers.

The Commission also aims to support the development of the ERA through specific policy initiatives. Opening up competition to national-level RTDI programmes is a key focus as it is seen as being a particularly cost effective way of spending public money. Based on the EC Impact Assessment accompanying the Communication 'A Reinforced European Research Area Partnership for Excellence and Growth'[57], the European Parliament has estimated that the implementation of the ERA has the potential to lead to an efficiency gain of at least EUR 1 billion per year over a period of 15 years.[58] However, this efficiency gain is largely dependent on how efficiently the ERA is implemented.

Another key mechanism which has emerged at the European level, and which is frequently used to implement the ERA, is the Open Method of Coordination (OMC) policymaking method, which is very closely linked to research and innovation policies.[59] The OMC is characterised by voluntary (as opposed to regulatory) policy coordination in the form of mutual learning initiatives. It is a Member State-led, non-binding, bottom-up policy process. The European Commission participates but takes a reflexive role, focusing on providing analyses and recommendations in response to Member State progress reports.

The diversity of the EU Member States research systems (e.g. in size, influence, priorities and governance structures) has been an obstacle to achieving the aims of the ERA. The different starting points of each Member State's system in terms of the institutions in place and the legislative and budgetary powers has led to different research and innovation policies. These factors acted as a hindrance to achieving a research policy, which allows for mobility of researchers and diverse forms of collaboration. Moreover, there are examples of considerable resistance among the Member States to allow European interference in national research policies[60] and the OMC approach is as such a 'soft' policy instrument that can be used to work towards an agreement; using peer review and peer pressure as opposed to legal interference to encourage Member State involvement and collaboration.[61]

[56] See https://ec.europa.eu/research/infrastructures/index_en.cfm?pg=esfri
[57] SWD(2012)212 final.
[58] European Added Value Unit, European Parliamentary Research Service, European Parliament Mapping the Cost of Non-Europe, 2014 -19. PE 510.983. First edition: March 2014. See http://www.europarl.europa.eu/the-secretary-general/resource/static/files/files/mapping-the-cost-of-non-europe--march-2014-.pdf.
[59] Tamtik (2012) Rethinking the Open Method of Coordination: Mutual Learning initiatives shaping the European Research enterprise
[60] See Gornitzka 2009 via Tamtik (2012) Rethinking the Open Method of Coordination: Mutual Learning initiatives shaping the European Research enterprise
[61] Tamtik (2012) Rethinking the Open Method of Coordination: Mutual Learning initiatives shaping the European Research enterprise

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2.2.4 Role of the European Science Foundation

The European Science Foundation was founded in Strasbourg in 1974. It was set up as an independent, non-governmental, non-profit organisation to help its Member Organisations collaborate internationally on research programmes with the goal of advancing European research collaboration and exploring new directions for research. Its membership encompassed 80 organisations in 30 countries in 2009, including research funding organisations, research performing organisations, academies and learned societies.

ESF instruments have included collaborative networking programmes (ranging from small networks to the large-scale EUROCORES), Exploratory Workshops and international conferences but also more policy-oriented Member Organisation Fora, Forward Looks and scientific advice. It has also played a coordinating role in some projects funded by the European Commission and acted as the legal entity to provide and manage the scientific, administrative and technical secretariat for COST (European Cooperation in Science and Technology). Through its activities and instruments, ESF has made major contributions to science in a global context. It covers the following scientific domains, closely associated with a scientific board or committee composed of experts in the field:

- Humanities
- Life, Earth and Environmental Sciences
- Medical Sciences
- Physical and Engineering Sciences
- Social Sciences
- Marine Sciences
- Materials Science and Engineering
- Nuclear Physics
- Polar Sciences
- Radio Astronomy
- Space Sciences

The ESF has provided administrative, management and coordination services to independent scientific boards/committees and collaborative scientific projects, whilst harnessing in-depth knowledge of the European Commission and associated research communities.

In the last years, after 40 years in stimulating European research through its networking and coordination activities, ESF has undergone a major change of focus. The European Heads of Research Councils (EUROHORCs), many of whom are/were members of ESF, decided to create a new organization with the aim of giving European research councils and other funders a stronger position to influence policy in Europe (under the European Research Area strategy) and, as a result, set up Science Europe in 2012. The decision was also taken to wind down ESF's traditional activities. Without this development, the EUROCORES Scheme may have continued to exist (this is suggested by the joint EUROCHORCs and ESF roadmap "*EUROHORCs and ESF Vision on a Globally Competitive era and their Road Map for Actions*"[62] published in the summer of 2008). The move away from managing funding programmes was seen as a key disadvantage by members of the research community who set up a group ('Eulenspiegel Action') to campaign against the closure of funding programmes as a result of the merger.[63, 64] The key message was

[62] See http://www.esf.org/fileadmin/Public_documents/Publications/EUROHORCs-ESF%20Vision%20and%20Road%20Map.pdf

[63] Science Insider European Research Heads Get a New Body, 21 October 2011. See http://news.sciencemag.org/2011/10/european-research-heads-get-new-body

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that the closure of ESF's funding programmes would leave a gap in the types of funding instruments available in Europe, leaving the European Commission's funding instruments as the main source. This would negatively affect "European collaborative, curiosity-driven (bottom-up) research".[65] Moreover, the effects would be particularly damaging to younger researchers – postdoctoral researchers to tenure track level[66] – who, because of their relative inexperience, have fewer opportunities than their more established colleagues in the large projects awarded as part of the Framework Programmes.[67, 68] Consequently, the Eulenspiegel Action group argued, the move would be damaging to European science (development) in the longer run.[69]

In light of these developments, the ESF has also undergone a change of focus, retaining the promotion of scientific developments through collaborative actions, but with a new emphasis on helping research funding organizations carry out their decision-making processes. This builds on core strengths and know-how developed in peer review and evaluation services.

2015 is the final year of winding down the traditional networking activities of ESF (EUROCORES, European Collaborative Research Projects, Exploratory Workshops, Research Networking Programmes); policy activities have already been taken up by Science Europe. The ESF continues to host five Expert Boards and Committees that provide in-depth and focused scientific expertise in selected disciplines. In 2016 the organisation will have a reduced core membership with around 15 full and associate members making up the governance. A different trading name and style will be introduced in order to differentiate between the 'old' ESF and the 'new' one. These and changes to its governance structure will be introduced in early 2016.

The ESF is working towards a sustainable future that will be focused on activities built on core strengths developed in peer review, evaluation and project management services. The aim is to develop an organisation that is self-financing and independent, but at the same time non-profit and customer-service oriented. The brochure "Serving and Strengthening Science"[70] provides an overview of these activities.

2.2.5 Other initiatives

There are a number of other European research collaboration instruments now in place (not including the EUROCORES scheme or other ESF programmes which are currently being closed down). With the exception of COST and regional initiatives (ORA and NordForsk), European funding is managed by the European Commission. The budgets for EU research programmes have grown steeply in the last programming periods. Horizon 2020 has a budget of EUR 80bn. In addition, the Member States contribute

[64] Science Insider Open Letters Fly as ESF Nears Key Vote on Future, 3 May 2011. See http://news.sciencemag.org/2011/05/open-letters-fly-esf-nears-key-vote-future
[65] Science Insider European Research Heads Get a New Body, 21 October 2011.
See http://news.sciencemag.org/2011/10/european-research-heads-get-new-body
[66] Ibid.
[67] Evaluation interview feedback
[68] Science Insider European Research Heads Get a New Body, 21 October 2011.
See http://news.sciencemag.org/2011/10/european-research-heads-get-new-body
[69] Evaluation interview feedback
[70] http://www.esf.org/fileadmin/Public_documents/Publications/Serving_and_Strengthening_Science.pdf

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additional funding for the ERA-Net and Joint Programming initiatives.

There are now at least four main instruments that encourage and fund 'bottom-up' research activities in Europe:

- The **European Research Council programme**. The ERC's funding tends to focus on individual excellence and does not offer funding for international collaborative research. As observed by Science Europe, the ERC have in the past supported a more EUROCORES-like structure of research projects, known as Synergy Grants. However, this particular scheme is currently under review.[71]
- **Marie Skłodowska-Curie actions**. This EU-managed scheme supports individual researchers "working across all disciplines, from life-saving healthcare to 'blue-sky' science". Grant funding can also support industrial doctorates, combining academic research study with work in companies, and other training that enhances employability and career development".[72]
- The **Open Research Area**. This initiative is limited to the field of social sciences and geographically focused on four countries (although international cooperation with countries outside Europe, e.g. Japan, is a possible).
- The **COST Network**. COST Actions are similar to the EUROCORES approach insofar as proposals are initiated by the research community and involve a minimum number of countries, and which are all supported by their national funding agencies. However, contrary to EUROCORES, COST Actions do not fund research per se, but networking and travel costs associated with a collaborative research project.

The Science Europe Life, Environmental and Geo Sciences Committee recently published a gap analysis with regard to identifying the international collaborative programmes aiming to foster cross-border research within its scientific remit. This concluded that there is a gap to fill for initiatives in place to foster 'bottom-up' research in the Life, Environmental and Geo Sciences. This Opinion Paper also looked at funding opportunities for 'frontier research in the Horizon 2020 Societal Challenges Pillar' and concluded that: "the work programmes released to date are very much focused on near-market applied research without taking into account the fact that discoveries, new products and applications often originate from frontier research at the earliest stage of commercialisation.

In the current work programmes, a new product is expected to be delivered within five to seven years. This proposed timescale does not match the average of ten to 15 years required by the pharmaceutical industry to complete the full research and innovation cycle starting from the discovery of, for example, a new drug compound to finishing with a product on the shelf ".[73] There is also a view that Horizon 2020 is not sufficiently open to responding to the needs of 'bottom-up' research or to all scientific disciplines. Thus, the 'Grand Challenges' approach was long debated as the social sciences and humanities research

[71] Science Europe Life, Environmental and Geo Sciences Committee Opinion Paper The Importance of International Collaboration for Fostering Frontier Research
[72] http://ec.europa.eu/research/mariecurieactions/
[73] Science Europe Life, Environmental and Geo Sciences Committee Opinion Paper The Importance of International Collaboration for Fostering Frontier Research

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communities felt overlooked[74]. As we argue later, the conclusions summarised here regarding a gap in support for the type of 'bottom-up' research promoted by EUROCORES is endorsed by many of those we consulted in the research for this evaluation.

Nationally and internationally, efforts are being made to develop R&I capacity and to align research with societal needs and challenges. There is a strong focus through Horizon 2020 and other EU programmes on tackling societal challenges, such as climate change and sustainable transport policy. With this shift, the traditional separation between public research and private sector innovation has declined and cooperation between academia and business is frequently incentivised in many forms. As explored in our background section, the EUROCORES Scheme was unusual in its bottom-up approach, which meant that research themes initially stemmed from the science community rather than policy priorities.

2.3 Key Features of the EUROCORES Scheme

The EUROCORES (EURopean COllaborative RESearch) Scheme was established by the ESF in 2001. It was recognised as a key instrument and included in the Sixth Framework Programme which supported the scheme by allocating EUR 20 million to it over five years starting in 2003. The idea behind the EUROCORES Scheme was to create a more balanced portfolio of European funding instruments with an emphasis on supporting 'bottom-up' collaborative research activities.

2.3.1 Developments in the 2003-08 period

As the previous section described, the EU Framework Programmes have over time shifted their focus, starting off as a narrow but science-led programme before taking on a more prominent industrial policy role. Along with being the first Framework Programme to include the former Eastern European countries, FP6 also contained predominantly policy-initiated themes. Creating a pan-European programme, which could cater for new and science-led ideas for research, was then simply a way of ensuring a sufficient width of funding instruments, and which could also easily be bridged (scientifically) with the FP calls for proposals.

EUROCORES encouraged researchers to network and collaborate across Europe and a number of other countries to promote collaboration on basic research activities across a broad range of disciplines and to disseminate the results.[75] At the time of the EUROCORES launch, there were no science-led programmes which operated across borders. EUROCORES also promoted collaboration at the level of policymaking. The Scheme was designed to facilitate science collaboration and large-scale research programmes to address complex research questions, but it also specifically aimed at stimulating cooperation between Europe's national funding agencies[76] which was not a mechanism that existed

[74] See for example Humanities and social sciences unsure of prospects in Horizon 2020, at http://www.researchresearch.com/index.php?option=com_news&template=rr_2col&view=article&articleId=1338335 and the AHRC UK response to the Common Strategic Framework for future EU Research and Innovation Funding Consultation, at http://blogs.bournemouth.ac.uk/research/files/2011/05/ahrc1.pdf

[75] EUROCORES Scheme European Collaborative Research Specific Support Action Final Activity Report

[76] ESF (2009), EUROCORES Final Activity Report.

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before. Specific criteria for research activities were that they should be innovative, of the highest quality, investigator-driven, collaborative and multidisciplinary.

After the termination of the FP6 funding in 2008, the ESF and its Member Organisations took ownership of the EUROCORES scheme. In that year, the ESF MOs decided that the scheme should continue in the absence of FP7 funding and that they would carry on funding the research component of the scheme and its management and co-ordination costs. This was essentially an early type of Joint Programming cooperation. Joint Programming, which is a central feature of the European Research Area, has the same basic aim as EUROCORES, namely "to pool national research efforts in order to make better use of Europe's public R&D resources and to tackle common European challenges more effectively".[77] This allows Member States to work together on a case-by-case basis on research issues which are of a national strategic priority. Practically, this could include working together through existing national programmes or to plan and set up new initiatives. Either way, this will require the pooling of resources and the selection and development of the most appropriate instrument(s), implementing the common agenda. Member States should also collectively monitor and review progress.

The approach promoted by EUROCORES and more generally by Joint Programming has many actual and potential benefits: it can focus efforts on common research challenges and develop solutions applicable to all those involved. Joint Programming can also increase Europe's position internationally, help build up critical mass among industry and lead to common processes in management and peer review practices.

But research collaboration also has associated costs and related disadvantages. Katz and Martin outline some of these including costs related to travel and related logistics costs. Other disadvantages include costs related to time (e.g. coordination of collaboration) and additional efforts needed to learn to work with new colleagues and disciplines, which may differ markedly from what researchers are used to. In addition there are also administrative costs associated with research collaboration from the point of view of the funding agency.[78]

The final activity report[79] of the FP6-supported phase of the EUROCORES Scheme included a range of interesting information that is also relevant to this evaluation:

- It estimates that in the 2003-09 period the **EUROCORES programmes leveraged EUR 150-160 million** of multi-nationally funded collaborative research.
- In terms of **quantified scientific outputs**, the programmes produced 33 patents and more than 5,000 scientific publications (of which 3,108 were peer reviewed).
- The activity and final report also underlines the creation of a source of **ESF competence and strategic asset** for peer review and evaluation, which was developed as part of the formation of the 42 Management Committees across the various programmes and equally the 42 International Review Panels engaged in reviewing EUROCORES research.

[77] See http://ec.europa.eu/research/era/what-joint-programming_en.html
[78] Katz and Martin (1997) What is research collaboration? Published in Research Policy 26 (1997) 1-18. Available at http://users.sussex.ac.uk/~sylvank/pubs/Res_col9.pdf
[79] EUROCORES Scheme European Collaborative Research Specific Support Action Final Activity Report 200.

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There has been at least one evaluation of EUROCORES at national level. In a review of its participation in EUROCORES, the UK Economic and Social Research Council (ESRC) found that its allocation of just under EUR 4.5 million to 19 CRP projects between 2001 and 2011 led to a leveraging of EUR 19.6 million of additional funding for European partner projects from other ESF MOs[80]. The same report also indicates that application processes differ across MOs which can cause added levels of complexity. From a scientific perspective, EUROCORES participation have brought a number of benefits to the UK researchers involved, including a pooling of expertise, a pooling of data, increased international profile, an opportunity to learn new techniques and an opportunity to develop junior colleagues. The study also suggested, based on EUROCORES participant surveys (albeit lacking a control group), that there was "strong evidence of additionality", meaning that none of the projects would have taken place to the same scale and with the same partners in the absence of ESRC's support through EUROCORES.[81]

Both direct (scientific) and indirect impacts were found while participation in the scheme had led to research that was of significant academic and scientific value. In particular, citations, academic publications and conference papers in all of the 19 UK-participating projects, while it has also led to new theories, new data sets and increased researcher standing in the majority of cases. Also, the EUROCORES research had implications for policy making, and could help to evidence and guide policy makers in their decision making, although the extent to which this was occurring in practice was less certain.

2.3.2 EUROCORES Programmes

Since 2003, EUROCORES has supported a total of 47 programmes. Table 2.2 provides a summary of the programmes, CRPs and IPs broken down by science discipline.

- The Life, Earth & Environmental Science (12) and the Physical and Engineering Science category (11) account for most programmes, CRPs and IPs;
- Bio-medical Science accounts for the least number of programmes (4) and CRPs (59). In Humanities only seven programmes exist while Social Sciences has eight programmes. Nevertheless, the number of CRPs in Humanities exceeds Social Science by three;
- In addition to the programmes of each science discipline there are five programmes that involve two and three science categories respectively. Here the collaborative programme between Humanities and Social Science (LogICCC) has most CRPs (8) while the cooperation between LEE and MED (EuroSCOPE) has only three CRPs.

[80] Evaluation of the ESRC's Participation in European Collaborative Research Projects (ECRPs) Frontline Ltd, Evaluation Committee, November 2011

[81] Evaluation of the ESRC's Participation in European Collaborative Research Projects (ECRPs) Frontline Ltd, Evaluation Committee, November 2011

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Table 2.2: Number of Programmes, CRPs and IPs per discipline

Discipline	Number of Programmes	Number of CRPs
Bio-medical Science (MED)	4	13
Humanities (HUM)	7	45
Life, Earth & Environmental Science (LEE)	12	89
Physical and Engineering Science (PEN)	11	69
Social Sciences (SOC)	8	39
LEE/PEN	2	7
LEE/MED	1	3
HUM/SOC	1	8
HUM/LEE/SOC	1	5
TOTAL	**47**	**278**

In the following sections, each science discipline is introduced briefly by defining their scope and by summarizing how the programmes in the respective science discipline performed overall. In regard to the former, information has been gathered through desk research. In regard to the latter, information has been extracted from the final evaluation reports of each programme. The tables following this section provide a more detailed overview of the review panel's feedback for each programme.

Biomedical sciences

Biomedical sciences (MED) focus on how cells, organs and systems function in the human body. Typical research conducted by bio-medical scientists focuses on the analysis of samples of tissue and body fluids which is highly relevant to the understanding and treatment of human diseases. The EUROCORES scheme is composed of four programmes in biomedical sciences and one programme which combines biomedical and Life, Earth & Environmental Sciences. Although there are only four (+1) programmes in the biomedical science category there is a relatively wide spread in time periods (ranging from the earliest to the latest time period of the EUROCORES scheme). Furthermore, there are a wide variety of topics and the participation of countries varies (although some countries are more represented than others).

Table 2.3: Bio-medical Sciences

EUROCORES Programme	Time period	Number of CRPs
Development of a Stem Cell Tool Box (EuroSTELLS)	2005-2008	3
Stress and Mental Health (EuroSTRESS)	2008-2011	4
Pan-European Clinical Trials (ECT)	2007- 2012	2
Functional genomic variation in the epilepsies (EuroEPINOMICS)	2011-2014	4
Interdisciplinary Programmes		
Science of Protein Production for Functional and Structural Analysis (EuroSCOPE)	2006 -2009	3

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Humanities

Humanities are academic disciplines that study human culture (e.g. examining how people process and documenting the human experience.) The humanities use methods that are primarily critical, or speculative, and have a significant historical element— as opposed to the mainly empirical methods of the natural sciences. Philosophy, literature, religion, art, music, history and language are all disciplines that fall under the humanities umbrella. The EUROCORES scheme funded seven humanities projects and two interdisciplinary humanities projects. Each programme involves various disciplines and covers all EUROCORES time periods ranging from small (three CRPs) and medium sized (5-7 CRPs) to big (21 CRPs) programmes.

Table 2.4: Humanities

EUROCORES Programme	Time period	Number of CRPs
Histories from the North – environments, movements, narratives (BOREAS)	2006-2009	7
Consciousness in a Natural and Cultural Context (CNCC)	2006-2009	5
Better Analyses Based on Endangered Languages (EuroBABEL)	2009-2012	5
European Comparisons in Regional Cohesion, Dynamics and Expressions (EuroCORECODE)	2010-2013	3
Understanding and Misunderstanding: Cognition, Communication and Culture (EuroUnderstanding)	2011-2014	3
Technology and the Making of Europe, 1850 to the Present (Inventing Europe)	2007-2010	4
The Origin of Man, Language and Languages (OMLL)	2003-2007	21
The Evolution of Cooperation and Trading (TECT)	2007-2010	5
Modelling Intelligent Interaction - Logic in the Humanities, Social & Computational Sciences (LogICCC)	2008-2011	8

Life, Earth & Environmental Sciences

Life, Earth & Environmental Sciences (LEE) is a broad research domain encompassing physical, biological and information sciences (including but not limited to ecology, biology, physics, chemistry, zoology, mineralogy, oceanology, limnology, soil science, geology, atmospheric science, geography and geodesy). The EUROCORES scheme consists of 12 programmes in LEE and four interdisciplinary programmes involving LEE. Consequently LEE has the largest share of both very large and small programmes. The topics of those 16 programmes vary widely but they can broadly be grouped in six different categories: climatology, biology (including maritime biology), chemistry (i.e. mineralogy), ecology, geoscience (i.e. topography) and physics (i.e. molecular science).

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Table 2.5: Life, Earth & Environmental Science

EUROCORES Programme	Time period	Number of CRPs
Climate Variability and (past, present and future) Carbon Cycle (EuroCLIMATE)	2005-2008	9
Ecosystem Functioning and Biodiversity in the Deep Sea (EuroDEEP)	2007-2010	4
Challenges of Biodiversity Science (EuroDIVERSITY)	2006-2009	10
Dynamic Nuclear Architecture and Chromatin Function (EuroDYNA)	2005-2008	9
Ecological and Evolutionary Functional Genomics (EuroEEFG)	2010-2013	8
Challenges of Marine Coring Research (EuroMARC)	2007-2011	7
Imaging, monitoring and modelling the physical, chemical and biological processes in the European passive continental margins (EUROMARGINS)	2003-2007	14
Membrane Architecture and Dynamics (EuroMEMBRANE)	2009-2012	6
European Mineral Sciences Initiative (EuroMinScI)	2006-2009	9
Ecology of Plant Volatiles, from Molecules to the Globe (EuroVOL)	2011-2014	3
Quality Control of Gene Expression-RNA Surveillance (RNAQuality)	2007-2010	3
4-D Topography Evolution in Europe: Uplift, Subsidence and Sea Level Change (TOPO-EUROPE)	2008-2012	10
Science of Protein Production for Functional and Structural Analysis (EuroSCOPE)	2006-2009	3
Molecular Science for a Conceptual Transition from Fossil to Solar Fuels (EuroSolarFuels)	2011-2014	2
Synthetic Biology: Engineering Complex Biological Systems (EuroSYNBIO)	2010-2013	5
The Evolution of Cooperation and Trading (TECT)	2007-2010	5

Physical and Engineering Sciences

Physical and Engineering Sciences encompasses a vast range of subjects ranging from micro-electronics to offshore oil platforms, and involves the application of creative reasoning, science, mathematics to real problems. Physical science is a branch of natural science that studies non-living systems. The EUROCORES Scheme funded 11 Physical and Engineering Science (PEN) programmes and two PEN/LEE programmes. In one occasion a programme had a follow-up due to a successful re-application (i.e. SONS I and SONS II).

Table 2.6: Physical and Engineering Sciences

EUROCORES Programme	Time period	Number of CRPs
Maximizing the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE)	2010-2013	7
Fundamentals of Nano-Electronics (FoNE)	2006-2010	5
Bio-inspired Engineering of Sensors, Actuators & Systems (EuroBioSas)	2011-2014	3
Origin of the Elements and Nuclear History of the Universe (EuroGENESIS)	2010-2013	4

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EUROCORES Programme	Time period	Number of CRPs
Graphs in Geometry and Algorithms (EuroGIGA)	2011-2014	4
Cold Quantum Matter (EuroQUAM)	2007-2010	6
Friction and Adhesion in Nanomechanical Systems (FANAS)	2008-2011	7
Smart Structural Systems Technologies (S3T)	2007-2010	7
Self-Organised Nanostructures (SONS 1)	2004-2007	16
Self-Organised Nanostructures (SONS 2)	2006-2010	7
European Quantum Standards and Metrology (EuroQUASAR)	2008-2011	3
Interdisciplinary Programmes		
Molecular Science for a Conceptual Transition from Fossil to Solar Fuels (EuroSolarFuels)	2011-2014	2
Synthetic Biology: Engineering Complex Biological Systems (EuroSYNBIO)	2010-2013	5

Social Sciences

Social sciences encompass the study of society and the relationships among individuals within a society. It tells us about the world beyond our immediate experience, and can help explain how our own society works. It in turn has many branches, each of which is considered a "social science". These include: economics, political science, human geography, demography and sociology. In the EUROCORES scheme there are eight social science projects and two inter-disciplinary social science projects. The ECRP programme was established before EUROCORES but ECRP projects then became part of the scheme. ECRP is a unique scheme in the social sciences funding landscape and addresses an important funding gap. In this way it helps to create valuable synergies between social scientists in Europe.

Table 2.7: Social Sciences

EUROCORES Programmes	Time period	Number of CRPs
ECRP I - 2005	2006-2009	8
ECRP II - 2006	2007-2010	5
ECRP III - 2007	2008-2011	2
ECRP IV - 2008	2009-2012	4
ECRP V - 2009	2013-2013	6
ECRP VI - 2010	2011-2014	4
Higher Education and Social Change (EuroHESC)	2009-2012	4
Cross-national and Multi-level Analysis of Human Values, Institutions and Behaviour (HumVIB)	2008-2011	6
Interdisciplinary Programmes		
Modelling Intelligent Interaction - Logic in the Humanities, Social & Computational Sciences (LogICCC)	2008-2011	8
The Evolution of Cooperation and Trading (TECT)	2007-2010	5

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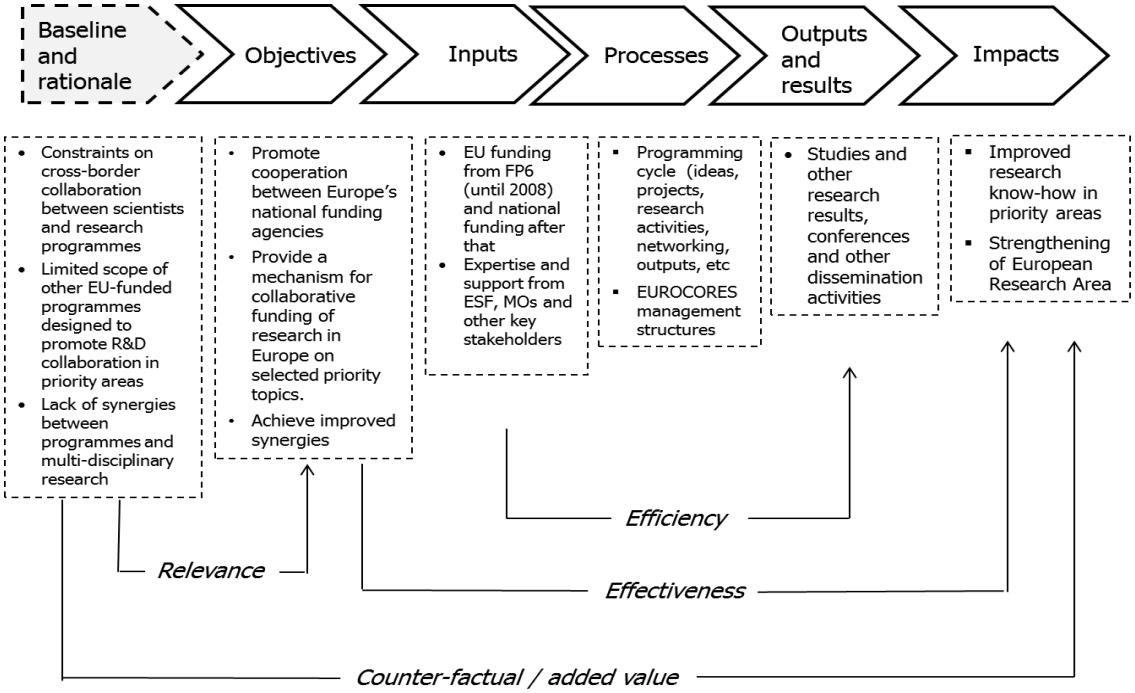
2.4 Evaluation Framework and Methodology

We now summarise the conceptual framework used for the evaluation of the EUROCORES scheme and describe the research activities undertaken for the study.

2.4.1 Evaluation Framework

The task of evaluation is to assess the extent to which the intended effects have come about. There are a number of key evaluation issues that can be structured around the intervention logic for an organisation or programme. For the EUROCORES scheme, this is illustrated below:

Figure 2.4: EUROCORES Intervention Logic



In the above diagram, a distinction is made between outputs, results and impacts. In the context of the evaluation of the EUROCORES scheme, these and other key terms can be defined as follows:

- **Inputs** – i.e. the MO and ESF funding and other support (e.g. ESF programme management expertise) provided to EUROCORES programmes and projects;
- **Activities and outputs** – programme and project activities, i.e. collaborative research, that was undertaken with the support of the EUROCORES scheme;
- **Results** – the specific outcomes generated by EUROCORES-supported programmes and projects (e.g. research reports, improved networking);

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- **Impacts and added value** – how the EUROCORES-supported projects help to promote improved EU research outcomes that contributed to the aims of the ESF and the European Research Area, and the extent to which European added value was demonstrated, i.e. the impacts that were achieved that could not be brought about by Member States on their own or by other European schemes.

There are a number of complications in evaluating interventions such as the EUROCORES Scheme. Below we highlight some of the most relevant to this study.

It is difficult to measure the impacts of research (in particular the longer term socio-economic and environmental impacts).[82] In particular, it can be difficult to identify and measure R&I effects because of the time lag between R&I measures being implemented, research results emerging and the longer-term effects occurring, including commercialisation and enhanced competitiveness through embedded innovation. Indeed, this process is often estimated to last over a decade. For example, the Swedish Innovation Agency VINNOVA believes that there is a lead-time of 10-20 years before the effects of R&I interventions become apparent at the socio-economic level.[83]

In addition to the time-lag, there is also the problem of attribution. When there are several interventions at play it also becomes more challenging to establish a direct connection between an observed phenomenon (such as economic growth) and the instrument or action. Isolating the role played by a single instrument or action is very often impossible, particularly when we aim to assess the impact at the macro level where multiple factors come to play a role. From a methodological point of view it is very difficult to attribute outcomes to inputs and it demands a number of assumptions. Thus, it is generally recommended that the focus should be on the contribution or the value of the research[84], i.e. to establish that a programme of actions has played a role in the impacts, rather than determining the exact share of the impact that can be claimed. One way is to distinguish between the different type of additionality arising (or expected to arise) from an intervention.[85] According to Cunningham et al the three different types are: input additionality (i.e. additional inputs arising from the intervention such as increased R&I expenditures, increased employment); output additionality (outputs that are created due to the intervention such as scientific outputs) and behavioural additionality (effects related to less tangible changes in organisational (and collaborative) behaviour).

The challenge of assessing the added value of an intervention such as EUROCORES is both a methodological and political challenge. Added value is a concept which can have a different meanings to different actors. It is strongly linked to the drivers and motives of different actors for the specific actions they are involved in, and therefore linked to different types of impacts and benefits (depending on viewpoint). As a European (political) concept, European Added Value has also evolved in tandem with the

[82] Mahieu et al (2014) Measuring scientific performance for improved policy making Study IP/A/STOA/FWC/2008-096/Lot8/C1/SC13 April 2014
[83] VINNOVA (2012) Impacts of Innovation policy: lessons from VINNOVAs Impact studies.
[84] Levitt et al. 2010, p. xiii.
[85] Cunningham et al (2012) The Impact of Direct Support to R&D and Innovation in Firms Compendium of Evidence on the Effectiveness of Innovation Policy Intervention. Manchester Institute of Innovation Research. Manchester Business School, University of Manchester.

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EU Framework Programmes. For example, up to and including FP4, European Added Value was seen as taking the form of networking, cohesion, scale benefits and so on was largely seen as sufficient justification for the FPs. In FP5, the focus shifted towards socio-economic benefits. The concept thereafter evolved from "adding value to national efforts through scale and networking to playing a role in coordinating Member State policies and taking wider actions in support of EU-level Policy". [86] It is also a challenge to capture the added value concept from a methodological perspective. [87] In order to assess the added value at European level, ideally these activities would be compared with similar actions (or no action) taken at the national level to help identify the counter-factual. However, in practice this is a difficult exercise due to the lack of comparable activities and data. [88]

It is also a challenge for evaluations to assess the combined effects of different mixes of policies. The idea of policy interaction (or policy mix) recognises that that policy interventions are deployed in an already busy (and interacting) environment which includes other policy mechanisms. A policy mix is not the outcome of one policy actor but is the result of a multitude of actors from different policy positions that all have influence on a given space (geographical or sectoral). In the case of the EUROCORES Scheme, its effectiveness was influenced by various policies – national policy, bilateral policy (e.g. bilateral cooperation in place before or as a result of EUROCORES collaboration), as well as European policy.

Evaluation also needs to take into account developments in the field of research and innovation. Traditionally, the theoretical foundation for encouraging research and innovation (R&I) activities has been that of the linear model of innovation**.** This argues that innovation starts with basic research, followed by applied research and development, and ends with the development of innovative new products and services and their diffusion.[89] Taking the case of the EUROCORES Scheme, this scheme fulfils needs at the very beginning of this process (supporting basic research). Although this model sometimes allows for feedbacks, it generally tends to see the R&I process as moving in a single direction and is essentially based on a 'technology-push' conception.[90] Nonetheless, this linear model of innovation has been applied for many decades and is very influential. The concept has, however, also been criticised for its path-dependency. Yet its wide application has justified many national governments to support science and innovation.

A response to this increased complexity – and to the linear model of innovation – has been that of the innovation system model. Quoted in Izsák et al, Lundvall (1992), this defines innovation systems as being

[86] *Vullings et al (2014) European Added Value of EU Science, Technology and Innovation actions and EU-Member State Partnership in international cooperation*

[87] For example, A recent (2014) study on European Added Value used CORDA data as a basis for developing an 'EAV database', however this approach proved to have limitations and the database appeared not a very suitable instrument for quantifying European Added Value. CORDA lacked "sufficient quantitative information available about the inputs, outputs and benefits at the levels needed to compare the different benefits" See *Vullings et al (2014) European Added Value of EU Science, Technology and Innovation actions and EU-Member State Partnership in international cooperation*

[88] Vullings et al (2014) European Added Value of EU Science, Technology and Innovation actions and EU-Member State Partnership in international cooperation

[89] Godin (2005) The Linear Model of Innovation: The Historical Construction of an Analytical Framework. Project on the History and Sociology of S&T Statistics, Working Paper No. 30

[90] Martin, Michael J.C. (1994). Managing Innovation and Entrepreneurship in Technology-based Firms. Wiley-IEEE. p. 43.

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comprised of a number of elements and the relationships (links) between them, where the social interaction between economic actors shapes the learning processes and information flows, which may result in innovations. Learning has in this instance become a key aspect of national R&I systems, which result in the accumulation of technological capabilities. This approach stresses the interactive and collaborative nature of knowledge accumulation through links between the actors involved in the R&I process.[91]

Developing Lundwall's work further, Arnold and Kuhlmann (2000) define an innovation system as being composed of a number of key elements such as demand for innovation, framework conditions such as the regulatory framework or tax system, industrial systems composed of large companies, SMEs and start-ups, education, university, and research systems, intermediaries such as business and support organisations, political systems and infrastructures including an IPR regime, the availability of venture capital and the development of technical standards. Whilst all the different elements in an R&I system have the potential to reinforce one another, they may also risk blocking one another and have an opposite, rather than the desired, effect.[92]

Viewed from a system's perspective, the EUROCORES Scheme was an instrument which had a potential impact on the European R&I system as well as on national R&I systems insofar as it required coordination across a large number of countries in the support of research activities designed to (initially) benefit groups of researchers as well as European science.

[91] Izsák et al (2013) Lessons from a Decade of Innovation Policy What can be learnt from the INNO Policy TrendChart and The Innovation Union Scoreboard. Final Report.

[92] Quoted in Izsák et al (2013) Lessons from a Decade of Innovation Policy What can be learnt from the INNO Policy TrendChart and The Innovation Union Scoreboard. Final Report.

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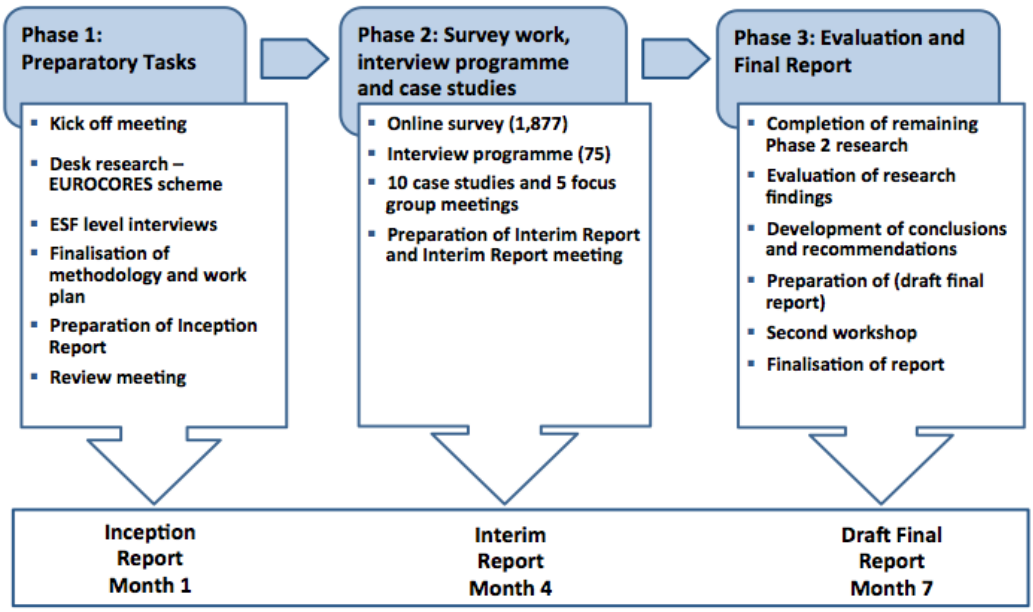
2.4.2 Methodological Approach

The assignment was carried out in three phases:

- **Phase 1: Preparatory tasks** - a set-up meeting with the ESF, interviews with ESF staff, desk research, and the finalisation of the methodological approach. These and other elements were presented in an inception report (April 2015);
- **Phase 2: Survey work, interview programme and case studies** – further desk research, two surveys, an interview programme and case studies, and two focus groups (Brussels, Bratislava) leading to an interim report (July 2015);
- **Phase 3:** The evaluation was completed with a detailed analysis of the research findings and preparation of a final report (October 2015).

The following diagram provides an overview of the work plan for the assignment and an indication of the timing of the different phases.

Figure 2.4: Overview of Work Plan



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Phase 1 – Preparatory Tasks

At the outset of the assignment, we undertook a number of preparatory tasks:

- Kick-off meeting with the ESF and preliminary interviews;
- Desk research to begin the analysis of the information and data shared by the ESF;
- Finalisation of the methodological approach and arrangements for Phase 2, including interview guides and survey questionnaire;
- Preparation of an inception report and review meeting with discussions/one-to-one interviews.

The assignment started with a **set-up meeting** with the ESF, held in Strasbourg on 31 March 2015. The purpose of this meeting was to discuss the proposal and terms of reference for the assignment, in order for CSES to understand the needs of the ESF and the purpose(s) of the evaluation, and to agree a detailed work plan and timetable. CSES followed this meeting up with a number of preliminary group interviews with the ESF to discuss the EUROCORES scheme in more depth.

During Phase 1 we also carried out an inventory of the data available and initial **desk research** to review existing material on the EUROCORES scheme. This included background information on the EUROCORES Scheme (About EUROCORES (2007), EUROCORES Scheme Poster (2007), Terms of Participation in the EUROCORES scheme (2010) and Glossary of terminology (2013)); documents on the EUROCORES Programmes including programme brochures and the interim and final reports; review reports on EUROCORES implementation (EUROCORES Scheme Review Report (2007), reports on the European Collaborative Research Projects (ECRP) Report Scheme, Evaluation and Science Policy Assessment (2008)); the European Commission's report entitled EUROCORES Scheme final activity report (2009); the Survey on EUROCORES Networking and Coordination (2010); and the evaluation of the ESRC's Participation in European Collaborative Research Projects (ECRPs) (2011); and the various EUROCORES newsletters and news updates.

We also examined two ESF databases: a database of the programmes and successful and unsuccessful theme and full proposals, statistics on the various stages of the application process; and, secondly, a contacts database containing details of EUROCORES stakeholders including the Managing Committee members (360 available contacts), Associated Partners (388), Principal Investigators (867), Programme Leaders (259) and Scientific Committee Chairs (3).

During Phase 1 we also finalised the **methodological framework and research tools** for the assignment including the survey questionnaires (these were piloted with the ESF), interview checklists and the selection of EUROCORES programmes for the case studies. An **inception report** was submitted on 27 April which was followed by a review meeting with the ESF.

Phase 2 – Survey Work, Interview Programme and Case Studies

The Phase 2 research involved a number of tasks:

- Two surveys: (i) Principal Investigators and others involved in programmes and projects ('Survey 1)'; and (ii) EUROCORES Management Committee members and members of the Scientific Committees

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('Survey 2');

- Interviews (mainly by telephone) with MOs, former and current ESF staff, and those involved in EUROCORES programmes and projects to investigate the key evaluation issues in greater depth;
- Ten case studies focusing on a sample of EUROCORES programmes and combining interviews with desk research, the survey results and other research;
- Two focus groups (Brussels, Bratislava) involving EUROCORES stakeholders from clusters of EU Member States to discuss key issues relating to the EUROCORES scheme as a whole.

Below we provide further details on the various key research activities for the EUROCORES evaluation.

Survey

In total, 1,876 contacts were available for the survey work. The two surveys were launched on 21 May 2015 using SurveyMonkey. At the time when this report was prepared, we had received a total of 855 responses broken down as shown in the following tables. It should be noted that 'Survey 1' targeted 1,516 contacts (Project Leaders and others involved in programmes and projects) while 'Survey 2' targeted 360 contacts (EUROCORES Management Committee members and members of the Scientific Committees). During the course of the survey a number of reminders were sent to the target groups.

Table 2.8: Breakdown of survey responses – overall

Responses		Survey 1	Survey 2	Total
(1)	**Number contacted**	**1,516**	**360**	**1,876**
(2)	Bounced emails	12	4	16
(3)	Opt outs	95	33	128
(4)	**Completed questionnaires**	**736**	**119**	**855**
(5)	Responses rate 4/1 (-2,-3)	52.2%	36.8	45.6

Table 2.9: Breakdown of survey responses by country

Member State	Survey 1	Survey 2	Total		Survey 1	Survey 2	Total
Australia	2	0	2	Lithuania	0	1	1
Austria	32	12	44	Luxembourg	2	0	2
Belgium	26	3	29	Malta	0	1	1
Bulgaria	1	2	3	Netherlands	55	9	64
Canada	7	1	8	New Zealand	2	0	2
Croatia	2	1	3	Norway	21	5	26
Cyprus	0	1	1	Poland	16	4	20
Czech Rep	15	1	16	Portugal	13	4	17
Denmark	16	5	21	Romania	6	1	7
Estonia	4	3	7	Russia	5	0	5

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Finland	24	5	29	**Slovakia**	5	5	10
France	60	9	69	**Slovenia**	6	0	6
Germany	107	3	110	**Spain**	51	9	60
Greece	1	0	1	**Sweden**	34	6	40
Hungary	8	1	9	**Switzerland**	39	4	43
Ireland	13	3	16	**Turkey**	9	5	14
Israel	3	1	4	**UK**	61	5	66
Italy	49	3	52	**USA**	29	2	31
Japan	1	0	1	**Others**	11	4	15
Latvia	0	0	0	**Total**	**736**	**119**	**855**

Note: * A total of 15 respondents did not indicate which country they came from (Survey 1 – 11; Survey 2 – 4). These respondents are included in the 'Others'.

Table 2.10: Breakdown of survey responses by EUROCORES programme (survey 1)

EUROCORES Programmes	Number of responses	EUROCORES Programmes	Number of responses
BOREAS	35	EuroQUASAR	17
CNCC	12	EuroSCOPE	14
ECRP	53	EuroSolarFuels	11
ECT	7	EuroSTELLS	9
EuroBABEL	20	EuroSTRESS	9
EuroBioSAS	9	EuroSYNBIO	14
EuroCLIMATE	20	EuroUnderstanding	15
EuroCORECODE	11	EuroVOL	19
EuroDEEP	14	FANAS	18
EuroDIVERSITY	31	FoNE	13
EuroDYNA	14	HumVIB	19
EuroEEFG	25	Inventing Europe	17
EuroEPINOMICS	28	LogICCC	24
EuroGENESIS	21	OMLL	14
EuroGIGA	24	RNAQuality	11
EuroGRAPHENE	19	SONS 1	18
EuroHESC	21	SONS 2	14
EuroMARC	20	S3T	8
EuroMARGINS	32	TECT	22
EuroMEMBRANE	22	TOPO-EUROPE	51
EuroMinSci	26		
EuroQUAM	18	**TOTAL**	**819**

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Note: 43 respondents skipped this question. The total number per programme exceeds the total respondents as a number of the participants had been involved in more than one EUROCORES programme.

Reminders were sent to the target groups on four occasions (12 June – 9 July 2015). Although the number of responses was below the target of 60%, the sample provided good coverage of the various programmes, key stakeholder groups and countries involved in the EUROCORES Scheme. The survey captured data from 43 of the 47 EUROCORES Programmes and from most of the EU Member States participating in EUROCORES.[93] We also received a good number of responses from countries outside Europe (Australia, Canada, Japan, New Zealand, and the US) that participated in EUROCORES.

Interview Programme

The Phase 2 interview programme was undertaken to enable us to investigate the key evaluation issues in greater depth. The following table provides a breakdown of the interviews carried out as part of the evaluation:

Table 2.11: Breakdown of interviews

Interviewees	Number	%
ESF Management Committee, Scientific Committee, International Review Panel*	4	7
ESF EUROCORES staff	10	17
Member Organisations (Funding agencies)*	9	15
Programme Leaders, Principal Investigators and Associated Partners *	32	53
Other European and national science and policy organisations	5	8
Total	**60**	**100**

* There is a small overlap between these two categories, i.e. members of the ESF Committees may also be. EUROCORES Project Leaders or MO representatives.

The identification of interviewees was achieved through multiple channels. Firstly, we interviewed survey respondents who indicated that they would like to be interviewed as part of the evaluation; secondly, we identified contacts from the desk research and contacts database to provide broad coverage of MOs and those directly involved in the EUROCORES programmes covered by the research.

Case Studies and Focus Groups

As part of the Phase 2 research, 10 case studies were carried out focusing on EUROCORES programmes. These were selected on the basis of several criteria:

- The main primary criterion was to achieve a good spread of scientific disciplines. This criterion was prioritised as the EUROCORES scheme was designed as a domains-based intervention and because the scheme's main aim was to further scientific achievements.

[93] A small number of respondents (≈5) could not remember the name of the EUROCORES programme in which they had participated.

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- A second criterion was to achieve a good geographical coverage to ensure as many ESF MO countries were covered as possible.
- Other criteria included: (i) a broad timespan – most of the selected programmes had been completed but some were selected that were still running at the time of the evaluation; (ii) large and small programmes; iii) programmes where there was evidence of both achievements and challenges; and (iv) programmes involving differing types of activities.

The table below provides an overview of the EUROCORES programmes that were selected for the case studies.

Table 2.12: List of case study programmes

EUROCORES Programmes	Domain *	Countries	Timeframe	CRPs
Pan-European Clinical Trials (ECT)	MED	DE, SE, UK, US, FR, BE, NL, AT, HU, CH	2007- 2012	2
Functional genomic variation in the epilepsies (EuroEPINOMICS)	MED	DE, SE, UK, US, FR, BE, NL, AT, HU, CH	2011-2014	4
Consciousness in a Natural and Cultural Context (CNCC)	HUM	AT, BE, CY, CZ, DK, EE, FI, FR, HU, IT, LX, NL, PT, SK, ES, SE, CH, UK, US	2006-2008	5
The Origins of Man, Language and Languages	HUM	IT, FR, BE, NL, UK, SE, ES, FI, DE, EE	2003-2007	21
Ecosystem Functioning and Biodiversity in the Deep Sea (EuroDEEP)	LEE	ES, NL, FR, IT, IE, BE, PT, NO, UK	2007-2010	4
Molecular Science for a Conceptual Transition from Fossil to Solar Fuels (EuroSolarFuels)	LEE	NL, UK, DE, IT, TR, PL	2011-2014	2
Maximizing the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE)	PEN	AT, PL, IT, BE, SI, DE, FR, FI, EE, NL, CH, SE, TR	2010-2013	7
Self-Organised Nanostructures (SONS 1/2)	PEN	AT, BE, CZ, DE, IT, PL, ES, CH, UK	2004-07/2006-10	16/7
Higher Education and Social Change (EuroHESC)	SOC	AT, HR, FI, DE, IE, NL, NO, PT, RO, SE, CH, UK, US	2009-2012	4
Cross-national and Multi-level Analysis of Human Values, Institutions and Behaviour (HumVIB)	SOC	AT, BE, BG, CY, FI, DE, HU, IE, NL, NO, PT, RO, ES, SE, CH, TR, UK, US	2008-2011	6

*Note: Bio-medical Sciences (MED); Humanities (HUM); Life, Earth & Environmental Sciences (LEE); Physical and Engineering Sciences (PEN); Social Sciences (SOC); Bio-medical Sciences (MED).

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Focus groups

Two focus groups were also organised towards the end of the study to discuss the emerging findings from the evaluation and the implications for future research collaboration in Europe.

The first focus group took place in Bratislava (23 September 2015) and involved 10 participants from three countries (AT, HU and SK). This session was especially helpful in examining the benefits of the EUROCORES scheme to smaller and 'newer' EU Member States. The second focus group took place in Brussels (1 October 2015) with five participants from two countries (BE, NL) and a representative from Science Europe. This focus group concentrated on the more strategic issues concerning research collaboration in Europe and what could be learnt from the experience of the EUROCORES scheme.

3. Assessment of EUROCORES Performance

In this section we analyse the results of the research for the evaluation of the EUROCORES Scheme. Section 3 combines the feedback from the desk research, survey, interviews, focus groups and case studies. We begin with an assessment of the EUROCORES application procedure (Section 3.1), before discussing the ESF management of the Scheme (Section 3.2). We then look at the cross-border collaborative aspect (Section 3.3) and finally present our findings on the EUROCORES outcomes (Section 3.4).

3.1 Origin of EUROCORES programmes/projects and the application procedure

As we outlined in Section 2, EUROCORES was seen as an instrument which could help achieve a balance within the portfolio of research funding instruments available at European level insofar as it provided an opportunity for the science community to submit ideas for research themes which could be taken up and funded by the national funding agencies. It thus provided an alternative to the largely top-down approach to research as funded by the European Commission.[94] The FP6 phase of EUROCORES ended in March 2009 during which time the Scheme had supported 23 programmes, all of which were managed by the ESF, but funded by ESF's Member Organisations via the Individual Projects (IPs) commissioned under each Programme.[95]

From 2005 the EUROCORES Scheme worked through annual call for theme proposals across all scientific domains. The successful themes, selected through a two-step peer review process, defined the scope for the Collaborative Research Projects (CRPs). Each Programme consisted of a minimum of three CRPs demonstrating a minimum level of trans-national collaboration as defined in the relevant Call for Proposals of the EUROCORES programme[96].

As noted earlier, although the Final Activity Report on the FP6-funded phase of EUROCORES was positive, the European Commission funding came to an end with the conclusion of FP6. The establishment of the ERA-Net programme – also first created under FP6, and which continued under the Seventh Framework Programme (2007-2013) – may have been an influencing factor and seen as a too similar or as a competing programme.[97] Despite the financial and logistical challenges of running EUROCORES there was a consensus in the ESF and among MOs[98] that there was a genuine interest from the science community to keep EUROCORES going. The ESF, through a series of discussions with its MOs, therefore continued to administer the EUROCORES scheme with the help of national funding (MO funds to be dedicated to research activities) and ESF funding (travel and networking undertaken as part of the Programme).

The table below shows the number of applications received by year and scientific domain. As can be seen, EUROCORES received the highest number of applications in the years 2009 and 2010, i.e. after the FP6 phase had ended.

[94] EUROCORES Scheme European Collaborative Research Specific Support Action Final Activity Report 2009
[95] EUROCORES Scheme European Collaborative Research Specific Support Action Final Activity Report 2009
[96] EUROCORES Glossary
[97] Interview feedback
[98] Interview feedback

3. Assessment of EUROCORES Performance

Table 3.1: EUROCORES Theme applications received by year and scientific domain

		2005		Ineligible	MED	LEE	PEN	HUM	SOC
N° applications	Single Committee	52	43	0	10	14	7	6	6
	Trans-Committee*		9	-	2	6	2	5	4
N° of approved proposals	Single Committee	5	3	-	0	1	1	1	0
	Trans-Committee*		2	-	0	1	1	1	2
N° of projects awarded	Single Committee	4	3	-	0	1	1	1	0
	Trans-Committee*		1	-	0	1	0	1	1
		2006		Ineligible	MED	LEE	PEN	HUM	SOC
N° applications	Single Committee	47	37	0	3	8	11	5	10
	Trans-Committee*		10	-	1	0	1	9	9
N° of approved proposals	Single Committee	7	6	-	1	2	2	0	1
	Trans-Committee*		1	-	0	0	0	1	1
N° of projects awarded	Single Committee	6	5	-	1	1	2	0	1
	Trans-Committee*		1	-	0	0	0	1	1
		2007		Ineligible	MED	LEE	PEN	HUM	SOC
N° applications	Single Committee	35	25	2	2	10	2	6	3
	Trans-Committee*		10	-	3	5	3	4	6
N° of approved proposals	Single Committee	6	6	-	1	2	1	1	1
	Trans-Committee*		0	-	0	0	0	0	0
N° of projects awarded	Single Committee	3	3	-	0	1	0	1	1
	Trans-Committee*		0	-	0	0	0	0	0
		2008		Ineligible	MED	LEE	PEN	HUM	SOC
N° applications	Single Committee	38	30	0	4	9	7	8	2
	Trans-Committee*		8	-	2	6	5	2	3
N° of approved proposals	Single Committee	6	5	-	1	1	2	1	0
	Trans-Committee*		1	-	0	1	1	0	0
N° of projects awarded	Single Committee	5	4	-	0	1	2	1	0
	Trans-Committee*		1	-	0	1	1	0	0
		2009		Ineligible	MED	LEE	PEN	HUM	SOC
N° applications	Single Committee	70	58	0	9	16	17	6	10
	Trans-Committee*		12	-	1	4	6	6	7
N° of approved proposals	Single Committee	9	8	-	2	2	2	1	1
	Trans-Committee*		1	-	0	1	1	0	0
N° of projects awarded	Single Committee	7	6	-	1	2	2	1	0
	Trans-Committee*		1	-	0	1	1	0	0
		2010		Ineligible	MED	LEE	PEN	HUM	SOC
N° applications	Single Committee	51	37	-	8	9	17	2	1
	Trans-Committee*		14	1	2	3	0	12	12
N° of approved proposals	Single Committee	5	4	-	1	1	1	0	1
	Trans-Committee*		1	-	0	0	0	1	1
N° of projects awarded	Single Committee	0	0	-	0	0	0	0	0
	Trans-Committee*		0	-	0	0	0	0	0

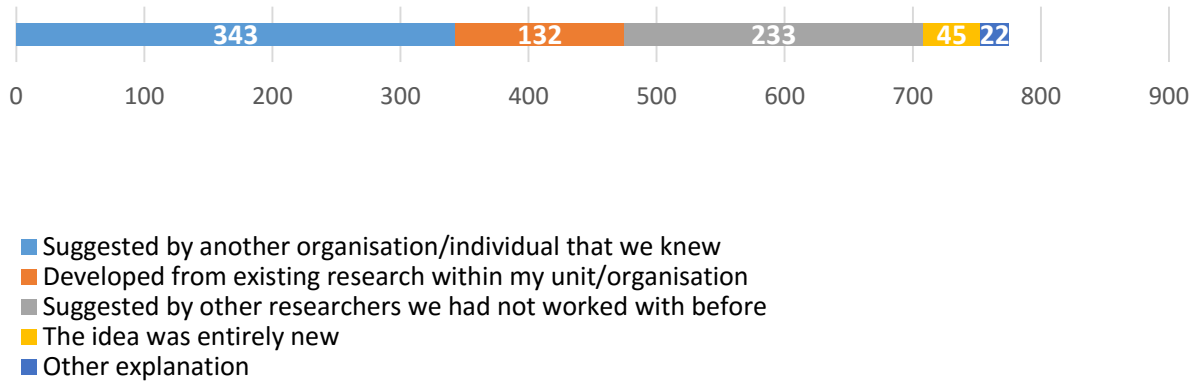
Source: ESF data

3. Assessment of EUROCORES Performance

3.1.1 How ideas for themes and projects originated

Our research indicates that in line with the 'bottom-up' nature of EUROCORES, the themes which were submitted under the VARIOUS calls were indeed 'independent ideas' developed by the research community. According to the survey of EUROCORES participants (N=670), in most cases (51.2% or 343 respondents), the idea for a project was suggested by another organisation/individual that the respondents knew or was suggested by other researchers the respondents had not worked with before (34.8% or 233 respondents). However, a significant proportion of respondents indicated that from existing research being undertaken within the researchers' own unit or organisation. Only in a very small proportion of cases (6.7%) was the idea considered to be completely new.

Figure 3.1: How did the idea for a Collaborative Research Project originate?



Source: Survey 1

From the interviews undertaken as part of this study it seems that a great deal of networking took place within the research community to make contact with and discuss possible collaboration with other researchers. The key proposer(s) of the theme to be submitted tended to be very well known scientists in the field concerned.

The development of the theme itself needed to be carefully considered by the proposers to ensure it adhered to the EUROCORES criteria (innovative, high quality, interdisciplinary, collaborative). In practice, this also meant the theme had to be broad enough to accommodate substantive sub-projects, take into account different scientific disciplines, the state of the research and know-how in Europe, and so on. Perhaps not surprisingly, many of the themes submitted had the support of an established network of researchers who had worked together before although there are also examples of themes that were truly new, at least on a European scale. The *Inventing Europe* programme, for example, helped to establish the history of computing as a stand-alone research area in Europe in a situation where this area of research had previously been dominated by the US.

It was not only the research community who were involved at the theme selection stage. There are also examples of participating researchers who first knew of the EUROCORES call from their national funding agencies (e.g. Czech Science Foundation) which informed national grant holders in relevant

3. Assessment of EUROCORES Performance

scientific domains of the EUROCORES opportunities. A number of researchers subsequently made contact with the theme proposer to discuss potential involvement. Equally, the ESF EUROCORES science officers were proactive in informing both the research community as well as MOs of the EUROCORES calls. This role was particularly helpful to interdisciplinary project teams as the ESF science officers tended to have a good overview of the activities of different countries, groups and disciplines, and as such could indicate which groups, previously unknown to each other, might benefit from working together.

Examples – how EUROCORES projects originated

- "We saw it as a good opportunity to continue and extend successful research we started in FP6 Epicure [sic] project."
- "The idea developed in my home organisation and was then extended in discussion with researchers in Europe, most of whom we knew."
- "I developed the idea for the proposal while participating in a research Institute in the USA but I had never before seen a call for proposals that would allow me to seek funding."
- "I was contacted by researchers I had not worked with before and invited to participate in the application."
- "It seemed a good, and perhaps the only, way to gather scholars from many countries into a comprehensive scheme."
- "EUROCORES was the only/most appropriate scheme for the development and realisation of this idea. It also allowed the participation of countries which could not have organised something of this sort on their own."
- "No local interest in the research theme."

Source: Survey 1

In the case of unsuccessful applications, very little use was made by those participating in the survey of the EUROCORES rebuttal procedure (only 2.9% of the sample). Those that had made use of the procedure were more or less evenly split between having received/not received feedback. In 55.3% of cases, the feedback was seen as 'very' or 'fairly' useful, while 32.9% regarded feedback as 'neutral'. The survey feedback (in the form of comments) suggest there was a notable variation in the quality of feedback received, ultimately indicating variation in quality of the reviewers. For example:

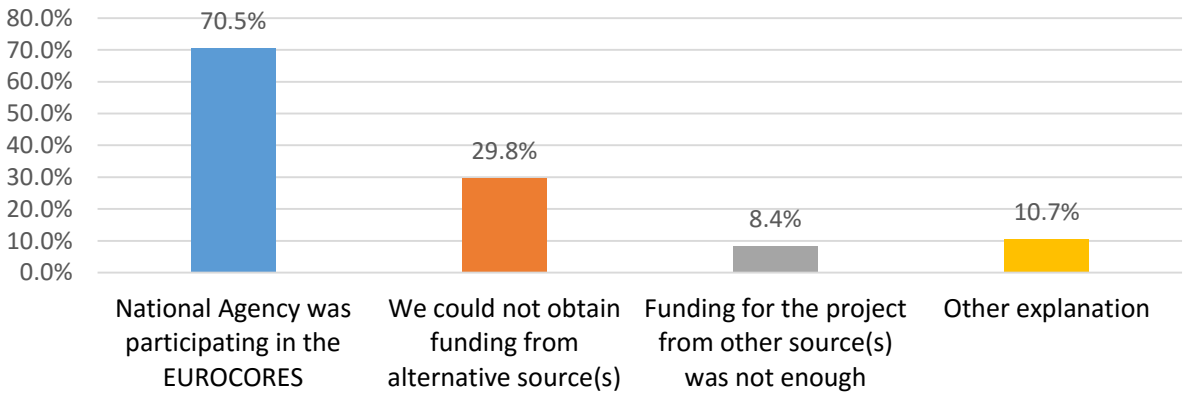
> "In 2006 I applied for EuroQUAM support within two separate projects. One was granted, the other was not. The feedback that I received on the application that was not successful was not useful at all. Evidently, at least two of the referees (I think out of 4) were not qualified at all. Their comments were even unfair (e.g. "too young researcher") [sic]."

3.1.2 Reasons for applying for EUROCORES funding

In most cases, the reason for applying for EUROCORES funding was that the applicant's national funding agency was participating in the programme and this was the most appropriate way of promoting a collaborative approach to the research in question. This explanation accounted for 71.3% of the survey responses. However, this question is somewhat misleading as national (funding agency) participation was also a prerequisite for projects to receive funding in the first place –

without funding agency support for the Programme, researchers would not be able to participate, or would need to find their own funding and collaborate in the form of an Associated Partner.

Figure 3.2: Why did you decide to apply for support from the EUROCORES scheme?



Source: Survey 1

The fact that a national funding commitment was a prerequisite, suggests that a 'real' major reason for applying for EUROCORES support was that it was not possible, largely because of their cross-border characteristics, to obtain funding for research projects from alternative sources (29.8% of responses). In some cases (8.4% of responses), funding from other sources was available but additional funding from EUROCORES was needed to raise the amount of financial support that was required for the project to proceed. If an 'other' explanation was given (10.7%), the respondents tended to be invited as a partner in the proposal. The examples of the feedback on this question are provided below:

Examples - Reasons for applying for EUROCORES support

- "It was a great chance to broaden international contacts."
- "The UK was not involved unfortunately, but the funding released from the CNR covered the ship costs".
- "The timing of the EUROCORES calls in the marine domain happened to be complementary to those of the EC, thus allowing to "bridge the gap" between EC funding phases."
- "Because the collaborative nature of EUROCORES was very appealing."
- "It seemed like an excellent opportunity to put together a team of investigators who were already working in parallel, to make all our work better."
- "I could not have collaborated with colleagues in Austria/Italy otherwise".
- "The EUROCORES scheme was a good option to conduct international, interdisciplinary research."
- "We had worked previously with ESF and had been impressed by the support and interest we had received".

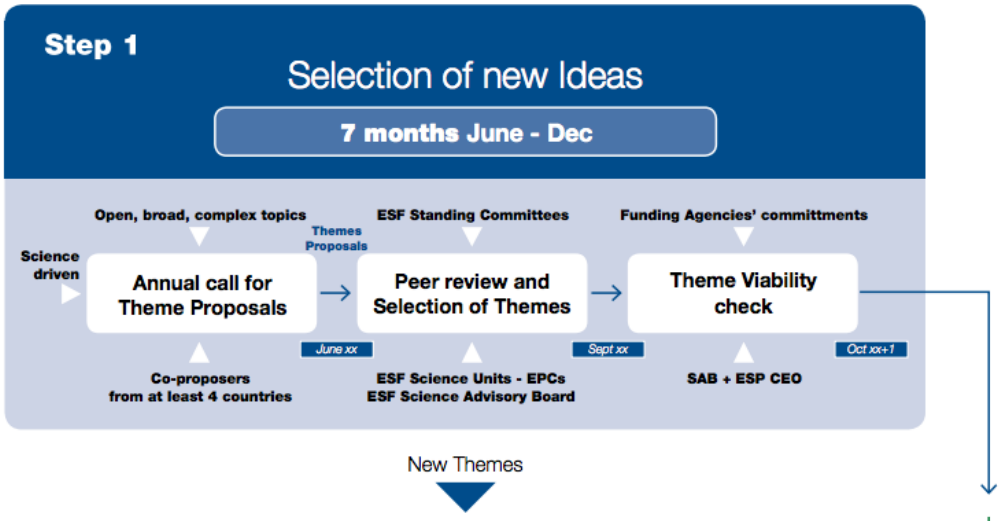
3. Assessment of EUROCORES Performance

3.1.3 EUROCORES application procedure

The EUROCORES application process is a three-step process, beginning with the call for themes. As the diagram below indicates, the theme call involved a call for initial outlines (ideas) for research themes, and which fitted into the EUROCORES profile. Following this, the other stages were:

- The theme proposals submitted to the ESF were peer reviewed, and the proposals ranked in order of excellence by the ESF Standing Committees.
- Based on the rankings, the final decision was made by the ESF Science Advisory Board which also made recommendations on how the themes should be developed into viable programmes (i.e. taking into account the level of interest shown by the MOs).
- These recommendations were passed on to the ESF Governing Council for approval and shared with the national Funding Agencies (MOs). The Funding Agencies at this point gave a first indication of the themes they would be willing to support through the funding of individual IPs.

Figure 3.3: EUROCORES Selection process Step 1 (Theme selection)



Source: ESF

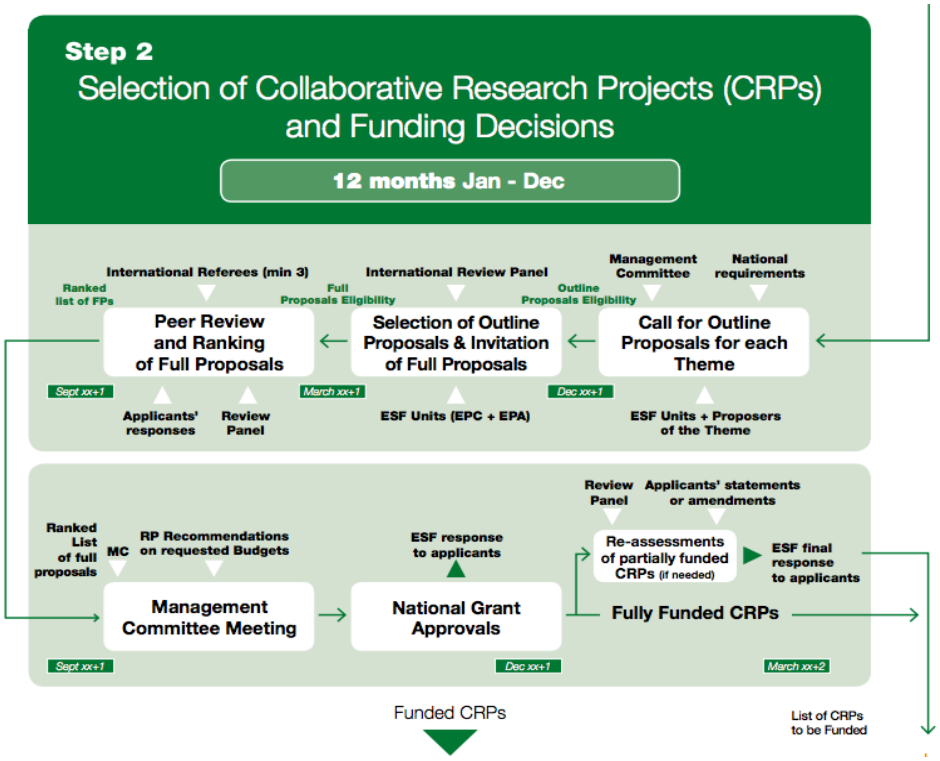
Once the initial themes had been selected, the ESF launched a EUROCORES call for outline proposals based on the selected themes (in practice, CRPs and accompanying IPs). This was a two-stage selection procedure that included an international peer review.[99] The original theme proposers would contribute to the drafting of the text for call for outline proposals. This was done in order to maintain the scientific core of the call for outline proposals.[100]

The outline proposals then underwent a peer review process and were subsequently ranked according to their scientific quality. The international referees also provided recommendations for funding. The complete list of ranked (full) proposals was then discussed at Management Committee meetings in order to be approved by at the national level by the funding agencies (MOs).

[99] EUROCORES Scheme European Collaborative Research Specific Support Action Final Activity Report 2009.
[100] Ibid.

3. Assessment of EUROCORES Performance

Figure 3.4: EUROCORES Selection process Step 2 (CRP selection)



Source: ESF

Much of the feedback we received indicated that there was a considerable amount of frustration from the scientific (and policy) community concerning this process. This frustration focused on a number of (related) issues:

- Firstly, the process was seen as cumbersome and in a number of instances – which appear to be very high but not quantified – the funding agencies appeared to go back on their initial budget allocations leading to a reduction in the number of successful proposals to be funded.
- Secondly, the process turned the slowest decision-maker into the decisive decision-maker. No project/programme could be initiated before there was the agreement of all parties involved. Depending on the size of the programme, this could involve dozens of funding agencies (in turn reporting to ministries or government departments).
- Thirdly, budgetary constraints affecting some countries negatively affected the quality of projects as EUROCORES could not simply fund the scientifically most outstanding projects but had to overlook highly ranked proposals in favour of lower ones as the former included countries/funding agencies that had 'run out of money'.

Our research suggested that the top three proposals (as ranked by the international reviewers) would normally be funded. However, due to the budget complications, proposals ranked after this could be overlooked in favour of lower ranked bids because of national funding considerations. Alternatively, proposals were not accepted as a result of national funding constraints had to be re-

3. Assessment of EUROCORES Performance

evaluated based on significant revisions. Views on the extent to which this situation led to the funding of unsuitable projects were divided. However, most of those we consulted agreed that, although damaging, EUROCORES tended to nevertheless support high-quality and competitive research.

According to our research, from the point of view of the national agencies, there were a number of reasons for the complications in putting together the necessary funding for EUROCORES projects:

- **Firstly, changes in the personnel responsible for attending the ESF Committees appears to have affected the level of commitment shown to EUROCORES.** The interview feedback also suggested that the turnover of representatives had a negative effect on the quality and speed of funding discussions within the Committees.
- **Secondly, national agency funding rules were also a complicating factor.** Each funding agency was bound by its own agency (and national) rules and regulations. Funding agencies could also decide to undertake their own appraisal of EUROCOROES project proposals which could lead to delays in reaching decisions, budget cuts for individual projects, or the ending of project funding altogether. National procedures differed from one Member State to another and although there was no indication from our research that national rules hindered EUROCORES programmes from going ahead, they seem to have caused delays to individual IPs which, in turn jeopardized the implementation of a programme as a whole.
- **Thirdly, although the EUROCORES rules required an indication of initial interest and commitment at the theme proposal stage, feedback from our interviews indicated that funding agencies may not have been able or willing to fund IPs that were considered as being outside of the remit of the agency's priority topics.** This may have been an issue particularly affecting interdisciplinary projects as these risked falling in-between 'scientific chairs'.

National funding agencies were also sometimes unable to respond to the number of projects that were selected. More especially, some (smaller) countries may have set aside funding for only one IP per programme and if successful proposals included more projects, this could cause difficulties. It seems that researchers and funding agencies that had a strong commitment to a particular programme tried to take action to avoid these situations. For example, a funding agency could advise researchers to avoid including colleagues from a particular country in their CRP proposal if this country was known for not funding EUROCORES projects. Conversely, the countries with large research capacity were often invited to join.

Overall, there was mixed feedback from the survey on the EUROCORES proposal procedures. Approaching two-thirds (65.6%) of the survey respondents rated the procedures as either 'good' or 'excellent' good. However, there was a considerable variation in relation to specific aspects:

- Eighty-seven per cent rated EUROCORES **theme and programme selection procedures** as either 'good' or 'excellent' and a similarly high rating (82.8%) was given to the fairness and impartiality of the CRP selection process;
- In contrast, only a third (34.7%) of the survey respondents rated th**e rebuttal process** in positive terms as being either 'good' or 'excellent' although most (62%) expressed a neutral opinion, reflecting an earlier finding that few applicants had made use of this procedure;

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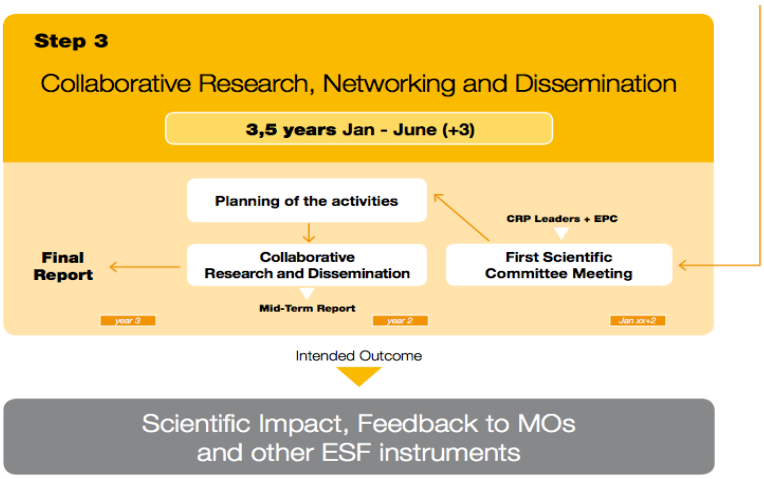
- Other aspects of the EUROCORES application procedure – the **length of time taken to process CRP applications and to make a decision, and to receive funding agreement** – received ratings that fell between these extremes, 62.3% and 61.1% respectively of the survey respondents saying these procedures were either 'good' or 'excellent'.

Once the final decisions of the national agencies had been confirmed, this signified the final approval of the Programme (CRPs and IPs). However, in practice the ESF and the MOs often (re)negotiated the final allocations. This was a time consuming activity and which appears to have delayed the approval process significantly. As mentioned above, if an MO declined to support successful IPs, then the CRP as a whole had to be re-evaluated. This meant the research team responsible for the proposal had to submit a revised application and have it peer reviewed again.

According to EUROCORES application guidance, the third phase of the scheme was the implementation of the CRPs through "collaborative research, networking and dissemination activities".[101] Each Programme began with a (or a series of) kick-off meeting(s) to allow all participants involved in a programme to meet each other, introduce the research involved in each project, and to discuss the future research activities. Each CRP had to prepare a report half way through the programme period (usually three years).

Figure 3.5: EUROCORES Selection process Step 3 (Programme implementation)



Source: ESF

A final report compiled by the Project Leaders of the CRPs was submitted at the end of the programme. This was accompanied by a review panel report which also commented on the success of the programme, achievements and challenges.

Some examples of the feedback we obtained from survey respondents on this procedure are provided below. The comments reinforce the view that whilst the EUROCORES theme and project selection procedures worked well, the length of time required to process CRP applications and to agree the funding was regarded less favourably.

[101] EUROCORES Scheme European Collaborative Research Specific Support Action Final Activity Report 2009

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Examples – feedback on the EUROCORES application procedure

- "Generally a good and not unnecessarily burdensome procedure."
- "The time between call and first submission was extremely short. The time between submission and outcome was rather long."
- "The theme and programme selection seemed somewhat opaque. The CRP selection process in contrast was clear, fair and impartial. However, the complex rules surrounding the CRP selection and funding made for a long period in which it was not clear what would exactly be funded."
- "CRP ranking in second round was a bit obscure. It took almost two years from the initial application to the final approval."
- "The bottom-up process of producing the Boreas [sic] all in which a wide but relevant part of the international research community played in a non-manipulative wide set of ideas produced and outstanding cutting-edge call which is best I seen [sic] in my entire career as academic researcher!"
- "The review committee was biased and incompetent. 1) their scientific expertise was insufficient for evaluating the various basic proposals; 2) the review panel changed the original goal of the proposal; 3) the original proposer of the EUROSTRESS program [sic] had an excellent score, but was rejected without argumentation; 4) there was an obvious bias in the selection process that could be traced to individual panel members; 5) the coordinator observed did not interfere even though he was asked to do so."
- "I applied within SONS-1 and was successful. However, when I applied within SONS-2 I found a completely different situation and an even better project did not even pass the first stage!"
- "Fundamentally I think the whole process was fine; the time to receive the final decision seemed long, but actually was not compared to other funding evaluations I have experienced".

Whilst there was broadly positive feedback on EUROCORES theme and programme selection procedures, our research highlighted the complications faced by the researchers whose proposals were ranked highly from a scientific viewpoint in seeking to secure funding from national funding agencies. In particular, the situation seems to have arisen quite frequently where despite a decision by the international reviewers and the ESF to support a particular programme, one or more national funding agencies decided not to follow through on their initial decision to fund IPs. As one survey respondent put it: "The scheme would have gained in transparency if the participating funding agencies had agreed to a firm a priori commitment, rather than an a posteriori "à la carte" commitment." Other comments obtained through the survey emphasised this:

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Role of national funding agencies in the EUROCORES project selection procedure

- "The major problem was national funding agencies not funding individual projects of the CRP after it was approved by ESF."
- "We had a very lengthy application procedure from the ESF, and then an additional one within the Academy of Finland. In the end the funding level in the Academy of Finland was so low, covering less than one PhD salary for 3 years that it seriously compromised the project".
- "We were led to believe that National Agencies had signed up to the program. However, once the project had passed all the (very significant) review procedures and was selected for funding, my own National Agency (NERC) withdrew. I'm afraid that that left me with a very negative view both of NERC but also of the procedure in general. I am pleased for my collaborators that the project was funded to go ahead regardless."
- "The system where national funding organizations have final word in decision making created an invisible third round of evaluation. This was not only unfair but harmful to the work of the research program. Good projects were rejected because of bureaucratic rules that were totally unnecessary."
- "The procedure of first evaluating proposals combined and then make political prioritizations is simply wrong. If a project gets excellent evaluation, all partners should be funded regardless of whether the country in question have "filled their quota". I am very critical to that practice."
- "The difficulty with Eurocores [sic] is that the funds have to be collected afterwards, which means that even with approval from ESF, member organisations can still block participation, which is what happened in fact. Thus, pivotal partners in the application for the scheme could not participate in the CRPs".
- "Because the promises of participation by some countries were not reliable, it took longer to receive the funding agreement then I would have liked because the delay hurt my ability to plan the research activities of a team that was quite large."
- "When we got the funding some of the aspects were already out of date."

As another person summed up:

> "It is problematic that the scientific decision is on the European level, but funding is expected to be provided by the national agencies. Thus a cumbersome decision process is inherent which might be undermined by one national agency ultimately not agreeing on the promised funding. It would be more straightforward if national agencies pay into a fund that is then distributed by a European agency."

Overall, the research suggests that the EUROCORES scheme's bottom-up and independent features were weakened by the fact that the funding agencies had the last say in the selection process and had a de-facto veto which could go against the scientific opinion of the review panels. The idea of a 'common pot'[102] was widely discussed during the post-FP6 period of the EUROCORES scheme and

[102] That is, an upfront agreement of Member Organisations to commit new funds to support an agreed research topic.

this would have made it possible to avoid this situation. It was the preferred funding mechanism of the ESF and certainly favoured by most of the EUROCORES participants consulted as part of this evaluation. Our research suggests that some national funding agencies would have been willing to support a 'common pot' approach. However, it appears that ultimately this approach was politically unfeasible. Had such as system been introduced it would have simplified the application procedure.

EUROCORES Peer Review

As the managing agency of the EUROCORES Scheme, the ESF developed a peer review system and put a considerable emphasis on this procedure from 2007 onwards. The procedure involved the ESF scheme management staff developing a database containing a list of leading scientists for each scientific domain with other information such as the extent they were willing to peer review EUROCORES proposals and how they performed in fulfilling this role. The ESF also asked the funding agencies for recommendations on who might be considered for the peer review role.[103]

According to ESF reports and also from interviews with ESF staff, the Foundation worked hard to achieve a broadly representative panel of peer reviewers from different countries and also to take into account discipline expertise and cultural differences. The ESF was also consistent in its approach to peer reviews across disciplines, i.e. used the same procedures across different disciplines to ensure consistency in approach to applicants.[104] Reviewers were requested to prepare a written assessment. The second step was a review panel meeting and at this stage a ranking of proposals was done. Although the ranking was based on scientific criteria, it also had a policy dimension insofar as it needed to take into account the funding available from national sources.[105]

3.1.4 Feedback on EUROCORES CRP applications

Amongst those who received feedback on their applications – whether successful or unsuccessful – opinions were quite divided on how useful this feedback had been with just over half (55.3%) saying it was either 'fairly' or 'very' useful and the rest expressing either neutral (32.9%) or negative (11.8%) view. Some examples of the views expressed on this issue are provided below:

Examples – Feedback on EUROCORES applications

- "The feedback helped reshaping some aspects that proved to be useful in the course of the project."
- "Two individual projects out of our CRP were evaluated negatively. The reasons were not really understandable for us."
- "In 2006 I applied for EuroQUAM support within 2 separate projects. One was granted, the other one not. The feedback that I received on the application that was not successful was not useful at all. Evidently, at least two of the referees (I think out of 4) were not qualified at all. Their comments were even unfair (e.g. "too young researcher")."
- "Our team very much appreciated the detailed comments from some of the assessors, which helped to strengthen the overall CRP."

[103] Interview feedback
[104] Interview feedback
[105] EUROCORES Scheme European Collaborative Research Specific Support Action Final Activity Report 2009

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- "I had two applications. For one the comments were useful, for the other proposal the comments and decision were not useful. One reviewer was possibly not an expert in the field."
- "The written feedback was "generally imprecise". At that time I had not yet served on an ESF panel and found it difficult to interpret."
- "Helped understand why it was rejected, helped improve the next resubmission and applications to other funding sources."

Source: surveys

The tables below summarise the success rate of EUROCORES Theme proposals and ECRP proposals (counted separately). The tables indicate very strong competition for funding although with somewhat higher success rates for the ECRP compared to EUROCORES projects.

Table 3.2: Success rate EUROCORES theme proposals (excluding social sciences ECRP)

Year	2005	2006	2007	2008	2009	2010
Number of applications	52	47	35	38	70	51
Ineligible	0	0	2	0	0	1
Number of approved proposals	5	7	6	6	9	5
Number of projects awarded	**4**	**6**	**3**	**5**	**7**	**0**
Success rate	**8%**	**13%**	**9%**	**13%**	**10%**	**0%**

Source: ESF

Table 3.3: Success rate ECRP projects

	Call pre-EUROCORES				Call as part of EUROCORES scheme					
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number of applications	37	24	23	60	50	27	23	31	49	54
Ineligible	-	-	-	-	1	1	2	4	5	5
Number of approved proposals	-	-	-	-	8	5	2	4	6	4
Number of projects awarded	6	5	4	8	8	5	2	4	6	4
Success rate	**16%**	**21%**	**17%**	**13%**	**16%**	**19%**	**10%**	**15%**	**14%**	**8%**

Source: ESF

As the tables indicate, although a EUROCORES theme proposal may have been deemed successful, it was not necessarily guaranteed funding. In each of the years 2005, 2006, and 2008 it appears that one successful proposal was not funded. In 2007, 2009 and 2010 these numbers were higher and in the 2010 proposal round, none of the five successful proposals were ultimately funded.

The ECRP fared better in this regard. It also had somewhat higher success rates. We did not receive any indication as to whether the high levels of competition and uncertainties around the final funding were a disincentive to submit a EUROCORES proposal. However, the survey finding that almost one-third of EUROCORES applicants indicated that they submitted a proposal as there was no other suitable funding instrument suggests that the low success rates were not a major deterrent.

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Indeed, the number of EUROCORES proposals submitted were higher in the latter years of EUROCORES although this may be a result of other factors. The economic crisis in Europe, for example, led to cuts in national research funding and this May have led researchers to turn to EU programmes as an alternative source of support.

3.2 EUROCORES Programme management

The EUROCORES Scheme was coordinated by ESF Science Officers and Administrative Coordinators:

- The **Science Officers** covering the various scientific domains were responsible for the scientific coordination and networking of the CRPs within each Programme. The Officer was a member of the Scientific Committee and reported to the Management Committee and the EUROCORES Coordinator who had overall responsibility of the scheme.
- The **Administrative Coordinators** were responsible for the day-to-day running of EUROCORES-supported activities as well as the overall budgetary and quality control of the scheme in accordance with its guidelines.[106]

During the earlier years of the EUROCORES Scheme, a Science Officer tended to responsible for several EUROCORES programmes. Similarly, the Administrative Coordinator was expected to spend 0.5 FTE per programme. However, with budget cuts and staff changes the number of programmes allocated to the individual Science Officers and Administrators increased over the years. This had a knock-on effect on the level of support that could be given to EUROCORES Project Leaders and participants.

Having said this, the interviews for this evaluation confirmed the very positive view the participants had of the role played by ESF Officers. Indeed, one interviewee and former EUROCORES Project Leader made clear that the main reason for providing an input to the evaluation was to have the opportunity to thank the ESF officers for their "positive and professional approach". In general, interviewees emphasised the high level of competence and commitment alike from the ESF staff, their ability to support Project Leaders and Principal Investigators, both in dealing with scientific challenges as well as with administrative issues. The high level of competence and commitment was favourably compared to other European programme administration. According to the ESF, the decision to staff the EUROCORES scheme management with individuals with highly relevant scientific backgrounds was a conscious decision taken at an early stage of the scheme to ensure effective procedures.

The study's survey feedback on the ESF's management of the EUROCORES programme is also generally very positive:

- Eighty-one per cent of survey respondents rated **scientific coordination** by the ESF as being either 'good' or 'excellent'. A very similar proportion (81.2%) expressed positive views about the administrative coordination of the programme by the ESF;
- **Financial administration** by national research funding agencies was not as highly rated although with 71.2% of survey respondents arguing that it was 'good' or 'excellent' the feedback was still overwhelmingly positive.

[106] EUROCORES Glossary

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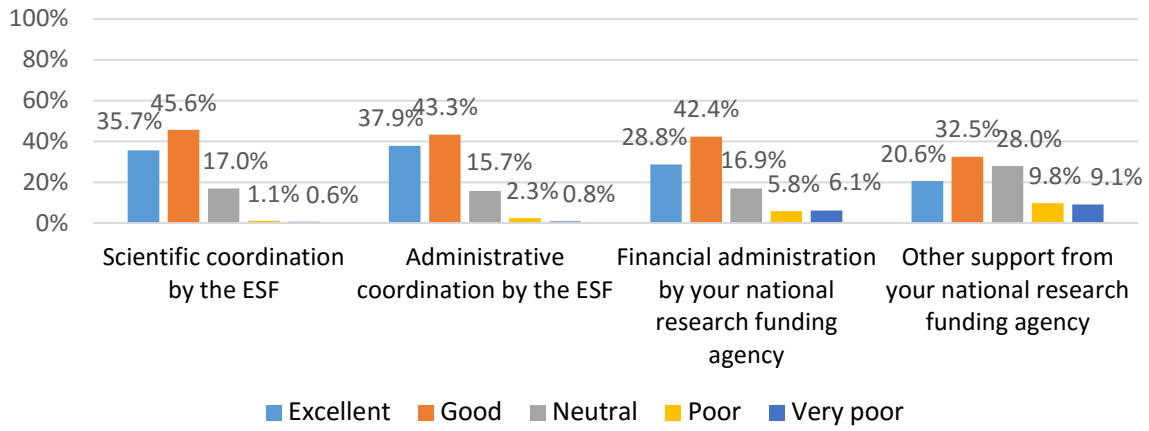
- However, there were divided opinions on **'other support' from the national research funding agencies** with 53.1% saying it was 'good' or 'excellent' whilst others expressed neutral or negative opinions.

A more detailed breakdown of the survey responses is provided below:

Figure 3.6: How would you rate the following aspects of the EUROCORES administration:



Source: Survey 1

Again, there was a contrast between the generally positive feedback on the role of the ESF in the administration of EUROCORES and opinions on the role of the national funding agencies. Below we provide examples of the feedback:

Examples – Feedback on EUROCORES Administration

- "All the administrative procedure and steps went smooth and straightforward."
- "The EUROCORES [sic] administration encouraged cross-fertilizing between different CNCC projects, but this in my opinion was to the detriment of the interdisciplinary exchanges within a given project, which require time and attention -- and funding."
- "Very lean administration as compared to EU grants."
- "Overall, the ESF office was efficient. The national funding agency (CNRS-INSU) much less so and sometimes seemed to be at a loss, not knowing what the exact rules were."
- "I had the chance of working under a national agency (FWO) which did not question neither the selection and ranking at European level, nor the proposed budget. This was not the case for many foreign agencies (NERC, FNRS, INSU-CNRS), which frequently downscaled the resources of the considered team to various extent, bringing the whole project at risk. The problem with EUROCORES was not at the level of ESF, but at the level of the different degree of commitment and implementation of the national funding agencies."
- "EuroMargins [sic] was actually the first running EuroCores [sic] programme, and in the initial

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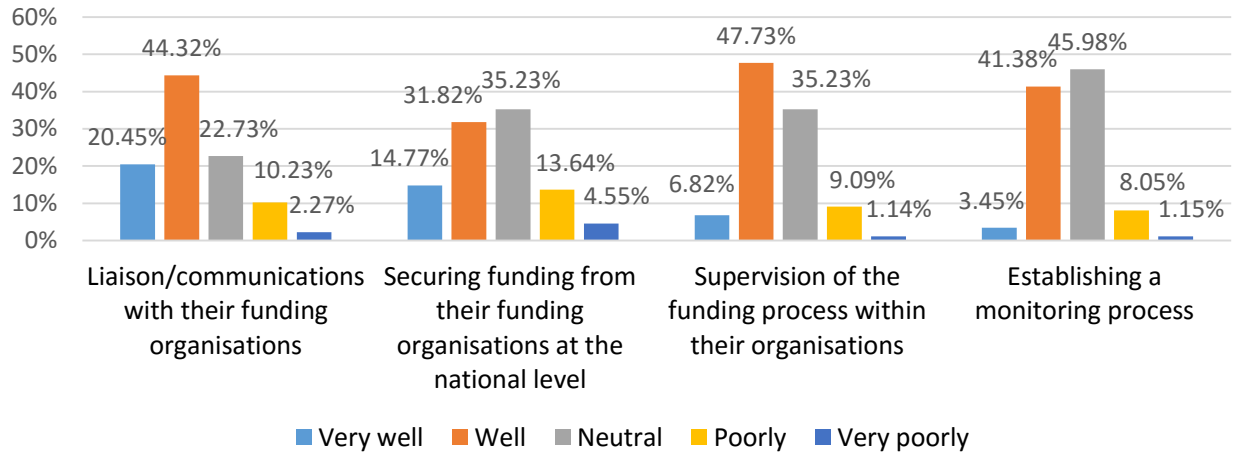
phase the cooperation between the various funding agencies was not very well coordinated (different decision dates, different duration of project funding, uncertainty about level of funding of different members of a multi-nation theme as ours was)."

- "At the beginning of the project in 2007, the scientific coordination by the ESF was excellent. However, with the collapse of the global economy, it became harder, and eventually impossible to obtain the networking funds that I needed to coordinate my large project and to integrate into the other 4 TECT projects."
- "Main issues were the way Associated Partners were treated as second-class citizens, and the way 'networking' was pushed at the expense of actual research activities. Stupid, stupid, stupid"
- "The financial administration by our national research agency was generally good, but very inflexible. I received confirmation of a positive funding decision towards the end of January 2011, with the funding period starting the very next day. There was no possibility to delay the start of the project, which meant that recruitment into the open position had to be done too quickly."
- "Overall I found the European scientific coordinators and administrators much better informed and more actively involved than their Canadian counterparts. We especially appreciated the attendance of ESF representatives at our various Workshops."

Source: surveys

From a different perspective, feedback from those directly involved in EUROCORES scheme and programme management suggested that most were rather lukewarm in their assessment of how the programme management committees performed in exercising their responsibilities.

Figure 3.7: The EUROCORES programme management committees had a number of responsibilities. How well did the following aspects of the arrangement work?



Source: Survey 2

As can be seen from the figure above, whilst a relatively high proportion (66.77% 'very well' or

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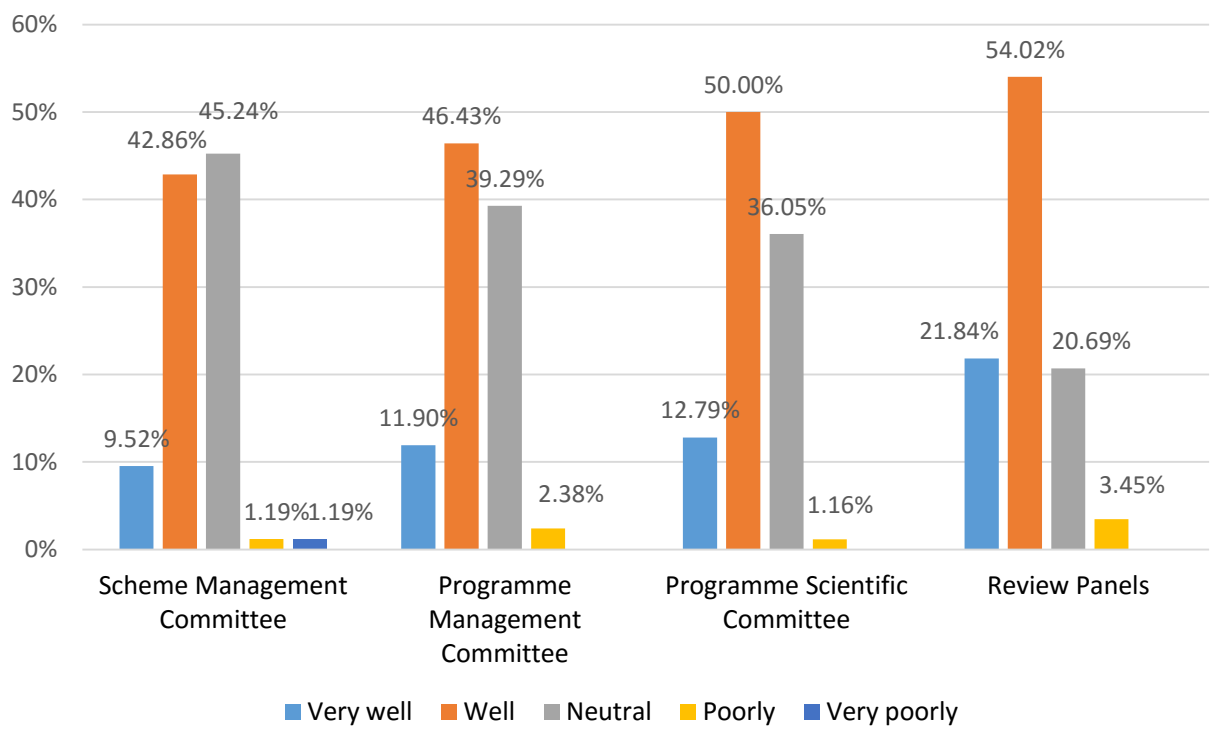
'well') expressed positive views regarding the function of 'liaison/communications with funding organisations', there was a less positive view regarding the other functions, especially in relation to the monitoring of EUROCORES activities. As one person noted: "Monitoring the programmes was not easy because of the coordination being held by ESF solely." However, in terms of monitoring the funding awarded under EUROCORES, this function remained with the funding agencies. As a result, we do not have any exact numbers in terms of the total financial contributions made (by the ESF and the funding agencies) to each EUROCORES programme.

The chart below provides a summary of the feedback obtained on how the different aspects of EUROCORES governance fulfilled their responsibilities:

Figure 3.8: Overall, how well did the following EUROCORES committees perform in fulfilling their remit?



Source: Survey 2

In general, the feedback suggests that EUROCORES governance structures performed 'well' although a high proportion of respondents expressed neutral views. To the extent that differences existed, there was a less positive view about the role of the scheme management committee than the other governance elements. One comment underlined this:

> "The scheme management committee was the place where the problems between funding agencies emerged. It suffered from too many replacements of participants, leading to repeat the discussions over and over again."

Otherwise, critical comments tended to focus on the complexity of EUROCORES governance structures. For example, one person argued that: "In principle, the committees worked very well, in

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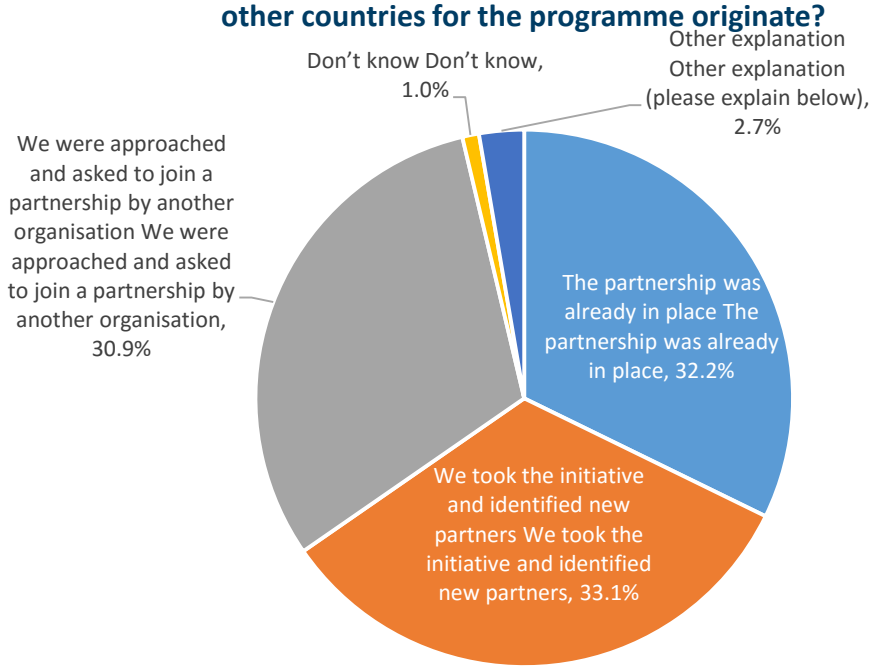
spite of the fact that the scheme was really cumbersome" whilst another argued that there was a: "More complicated management structure than is necessary." However, many of the survey respondents were unable to offer an opinion, as their involvement in EUROCORES had been too long ago to be able to recall how the committees they had sat on had performed. This could account for the relatively high 'neutral' ratings.

3.3 Cross-border partnerships

Cross-border research partnerships were required to be in place to be eligible for EUROCORES support and these partnerships originated in a number of different ways. According to the survey feedback, in a third of cases (32.1%), the partnerships already existed but in the remaining two-thirds of cases, they were new and formed specifically for the EUROCORES programme or project in question.

Figure 3.9: How did the partnership with organisations/individuals from other countries for the programme originate?



Source: Survey 1

In reality, in many if not most cases the origin of the EUROCORES partnerships combined several elements, i.e. existing research partnerships were expanded to include researchers from other countries. Some examples cited by the survey respondents are provided below:

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Examples - How EUROCORES partnerships originated

- "The partnership arose from a previous ESF Network."
- "There was a group of researchers that had wanted to engage in a project for a while, EUROCORES was our opportunity."
- "A mixture: there was already international collaboration within the initiating discipline (linguistics), but partners from other disciplines were actively sought out."
- "We took the initiative together with the coordinator of the CRP, mainly contacted existing research partners and identified one new partner."
- "The partnership was partially in place and then we took the initiative to identify and involve other partners."
- "After we were asked to participate by one of the groups, we (collectively) set up a consortium which contained four or five partners with which we already had well established links and running cooperation."
- "We had a long term contact with some of partners but the project was a good opportunity to establish the partnership with other."

Source: surveys

According to the survey work, in almost all cases the partnerships that were set up for the EUROCORES programmes and projects included researchers from an appropriate range of countries (93.2% of respondents indicated this was so). However, there were some exceptions, mostly linked to the earlier finding concerning the fact that researchers from some countries could not participate in projects because although the ESF had approved the proposal, not all the national funding agencies then endorsed the decision. As one survey respondent noted:

> "Two individual projects (representing two more countries) out of five did not get funded. If they had participated, we would have had a broader basis for comparative analysis and insights." Another explained that: "The main problem was the formal rules on how many IPs and maximal APs needed / were permitted to be from how many countries, etc. This made the planning very difficult. In addition, the decision by some national funding agencies not to participate, just when very excellent groups were just participating from that country, caused real problems. I think it would be much better to have one central decision rather than many decisions from individual agencies."

The interviews largely confirmed these findings. Indeed, it seems that Project Leaders often worked strategically from the very start of the proposal preparation stage to try and avoid funding complications and/or to accommodate the rather complex rules. Certain countries or funding agencies had a reputation of being less likely to participate in EUROCORES and researchers depending on funding from these sources were sometimes avoided when building cross-border research teams.

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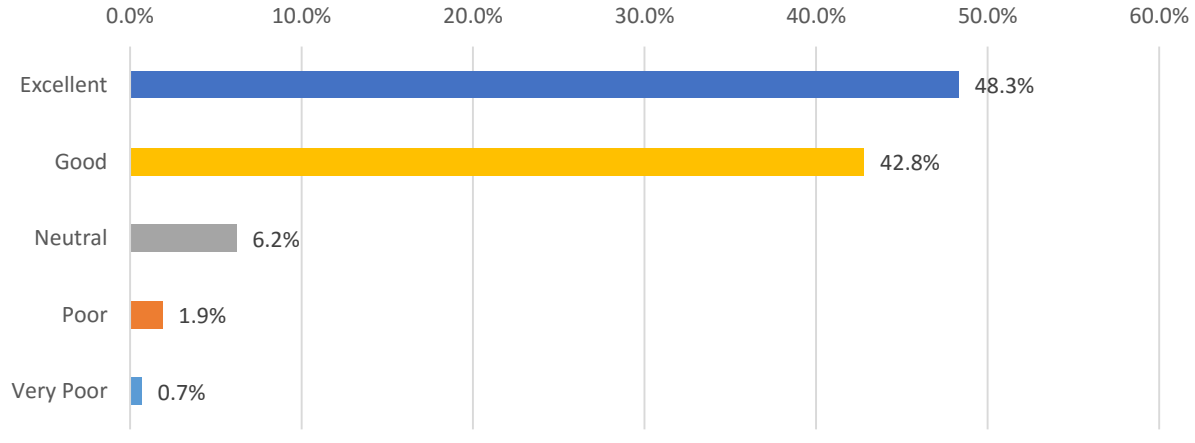
Table 3.3: How well did the following aspects of the partnership with other organisations/individuals work?

	Excellent	Good	Neutral	Poor	Very Poor	Total
Generating interdisciplinary scientific insights	**44.8%** 299	**45.0%** 300	**8.1%** 54	**1.6%** 11	**0.4%** 3	**667**
Stimulating creativity/scientific discovery	**52.0%** 344	**41.2%** 273	**5.0%** 33	**1.5%** 10	**0.3%** 2	**662**
Achieving research/ scientific outcomes	**44.6%** 296	**44.7%** 297	**8.6%** 57	**1.7%** 11	**0.5%** 3	**664**
Project management and administrative tasks	**23.6%** 155	**48.9%** 321	**22.7%** 149	**4.0%** 26	**0.9%** 6	**657**
Preparing reports and other deliverable	**24.3%** 160	**52.4%** 345	**19.8%** 130	**3.0%** 20	**0.5%** 3	**658**
Publicizing of the research outcomes, e.g. conferences	**38.1%** 249	**46.7%** 305	**12.9%** 84	**1.8%** 12	**0.5%** 3	**653**

Source: Survey 1

In general, collaboration between researchers in the EUROCORES project partnerships seems to have worked well. As can be seen, this was the view of the overwhelming majority (90.8%) of the survey respondents.

Figure 3.10: Overall, how would you rate the collaboration between the partners on this programme?



Source: Survey 1

However, this picture was not always as straightforward as the summary analysis above suggests. More particularly, within the EUROCORES partnerships, the working relationship between some

partners was inevitably better than with others; likewise, the nature of relationships sometimes changed during the lifetime of projects and programmes. One complication in this respect was the different start and end dates of projects, as the following comment from a survey participant makes clear:

> "The different timelines of the national agencies meant what was meant to be a 3 year project was spread across 4 years, which was problematic. My agency was efficient but several of the other agencies were much slower so the partners started in one case almost 9 months after our team."

Taking into account the findings from research overall, it seems that successful cross-border partnership working depended on a number of factors:

- **The degree to which the scientific relationship was already established:** research teams that had pre-existing contact/collaboration with each other had a better understanding of each other's research and ways of working together which often benefitted their EUROCORES collaboration.
- **Delays in the implementation of the programme:** delays in funding decisions or procedures could affect partnership working adversely, particularly because the EUROCORES programmes were relatively short in duration (three years) compared with other EU schemes. In particular, the three-year period was considered to be inconsistent with the four-year development of PhD student (a common time period in many counties).[107] EUROCORES participants highlighted the importance of a well-organised start to the collaboration with the minimum of delays. However, in addition to funding complications (see earlier), there could be other difficulties (e.g. in at least one Programme (EUROGraphene) delays occurred due to the Project Leader changing institutions and country which caused problems because the funding for the project could not be easily transferred.
- **Level of inter-disciplinarity:** the EUROCORES scheme funded a number of programmes that were highly interdisciplinary. In some cases there had been very little previous contact between the disciplines working together (e.g. history-GIS collaboration, neurophysiology – philosophy collaboration). These projects required additional time and efforts to come together. This was at times a challenge for Project Leaders and other researchers involved. For example, in the HumVIB programme, the level of inter-disciplinarity was high between as well as *within* CRPs. This meant that significant efforts were needed to manage each individual CRP, ultimately impacting on CRP collaboration at the programme level.
- **Personal and cultural differences:** good collaboration also required good personal and organisational relationships. Problems could stem from differences in personal, organisational or cultural factors.
- **Scientific competition/complementarity:** in a number of cases it seems that EUROCORES collaboration was hindered by scientific competition between teams (e.g. data obtained through one project was not shared with others who could also have benefitted from it).

[107] Maximising the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE) Review Panel Final Consensus Report

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More generally, the majority of interviews emphasised the importance of the ESF-funded project activities such as exchanges, visits and networking opportunities. These were regarded as demonstrating real added value and to have in particular benefitted younger researchers. Further examples of the feedback on partnership working are provided below:

Examples – Feedback on partnership working

- "Some collaborations were successful and fruitful, but others were totally unsuccessful."
- "The project meetings were real brain-storming sessions, providing new ideas and finding practical solutions for many technical problems. We highly appreciated this opportunity to work together as an international team on a common goal."
- "As is always the case, it ranged from excellent to good, and even neutral/poor in some phases of the research, depending on which partners."
- "Cross national partnerships are especially useful because they tend to be less competitive than local or national ones."
- "The collaboration was more difficult because the programme expected and urged us strongly (also with regard to later evaluation) to collaborate with other CRPs. These unplanned initiatives, not foreseen in the project application, took a considerable amount of time and energy from carrying out our CRP-internal collaboration."
- "The partnership started out very well and was especially beneficial for the young researchers (PhD students and post-docs) working in the project. However, the different start-end dates of the different projects within the CRP complicated the collaboration and once it became clear that there would be no follow-up to the project (as ESF and the Eurocores programme would cease to exist) the enthusiasm waned and the different projects started working more on a stand-alone basis."
- "The reduction of the project by our national funding agency lead into unsatisfactory funding and performance on our behalf with respect of the whole project although the other partners did their best to compensate for this."
- "It was excellent to have meetings also with research groups involved in other CRPs. I felt this was a particularly strong aspect of the EUROCORES programme."

Source: surveys

In relation to partnership working more generally, it is clear from the research that those involved in EUROCORES programmes rated aspects of collaboration concerning the research activities themselves as having proceeded more smoothly than non-scientific aspects (project management and administrative tasks, preparing reports and other deliverable, etc). One comment from a survey respondent epitomises this finding: "Fantastic scientific collaboration between the researchers. The only problems derived from the interactions with administrators in our two organisations, with delays with funding transfers and administrative issues".

In addition to the collaboration between scientists, EUROCORES also promoted joint working between European funding agencies. The mechanism that facilitated this cooperation between

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national funding agencies was new at the time of the scheme's launch and interviewees with experience of representing the funding agencies indicated that it took time to learn to work together according to the EUROCORES principles. It was also argued that the funding agencies learnt a great deal from EUROCORES and this know-how is now being put to use in the ERA-Net schemes.

3.4 EUROCORES scientific and other outcomes

There are a number of ways in which we assessed the scientific and other outcomes of the EUROCORES programmes (and the Scheme as a whole). Apart from the primary research tools (the interviews and survey work) we analysed the final reports and review panel reports submitted as part of the scheme deliverables. Although these are well-documented and detailed reports, the final evaluation report were written at the end of the three-year funding period which means they could capture all the outcomes resulting from the research activities.

Nevertheless, the conclusions of the final reports submitted were overwhelmingly positive. There are of course variations between programmes and projects. Some projects were recognised by the review panels to have been hampered by underfunding, delays in funding or by other complications, including difficulties in cooperation. Otherwise, a number of positive outcomes were reported:

- Not surprisingly considering the EUROCORES focus on innovative research, the most prominent output was **scientific publishing**. The rate and quality of publications and other scientific articles and books that were published was very high.
- A further important outcome of EUROCORES activities was also the **extensive involvement of younger researchers** (PhD students and early post-doctoral researchers) in EUROCORES programmes and networking activities. Our interviews highlighted that there were few alternative (European funding) opportunities which gave young researchers similar opportunities to develop their careers through cross-border exchanges, conference attendance, and networking with more established academics in their field. EUROCORES helped a new generation of researchers to establish themselves internationally at a key point in their careers.
- At least four of the EUROCORES programmes also produced **industry-related outputs** (SONS, 3ST, EuroGRAPHENE and EuroSYNBIO). In the case of EUROGRAPHENE, the final report highlighted nine patents and the creation of a spin-off company GraphenSiC by Linköping University (involved in GRAPHIC-RF) as outputs/outcomes of the programme.

Looking at the outcomes from a (scientific) domain perspective, we summarise some of the key conclusions drawn from the reports below:

Biomedical sciences

Overall, the biomedical programmes were evaluated positively and measureable output was noted in most CRPs (publications, maintaining leadership in the field, knowledge transfer, funding synergism). Nevertheless, there was also some criticism. For instance, there were inequalities between CRPs within programmes (e.g. ECT) or the translational objective (i.e. clinical impact) were not achieved in EuroEPINOMICS.

Nevertheless, EuroEPINOMICS was still very successful in achieving its main goal – to promote collaborative research in epilepsy in Europe with a focus on basic research on genetics and

pathophysiology of rare and common epilepsy syndromes. Interdisciplinary research and international dimension were major features of EuroEPINOMICs and the added value of the programme. Thanks to the international dimension of the programme, it was possible to achieve the critical mass of patients needed to perform the research and make a statistically relevant analysis.

Summary of EuroEPINOMICS achievements (case study)

- EuroEPINOMICS aimed to identify novel epilepsy genes and genetic variants predisposing to epilepsy and drug response, and to unravel their molecular pathways.
- The idea of the programme came mainly from the previous experience of the EPICURE collaborative research project (funded by the EU 6th Framework Programme). The EUROCORES scheme was seen as an opportunity to get funding (that could not be obtained from alternative sources) and extend the research about some of the issues that came out from EPICURE project, making their existing collaborations more concrete/focus in terms of the research objectives.
- The review panel noted a very good overall performance of the programme with achievements that go beyond the initial goals. A wide number of activities took place under the programme and several papers in prestigious and high-profile journals were published, allowing the dissemination of the main results of the CRPs worldwide.
- Likewise, the programme has resulted being very productive in terms of scientific outputs. However, the review panel criticised that not all the CRPs were so productive or worked so closely to achieve these goals. While the collaboration between EpiGENet, RES and CoGIE CRPs was excellent and very productive, especially the collaboration between the two latter, the integration of EPIGLIA CRP with the other 3 CRPs was not as expected. In this regard, it is stated that EPIGLIA CRP started one year later and this could have had an impact on the collaboration and outputs.
- As regards the main impacts of the programme, all stakeholders stressed the creation of new networks that would keep on-going beyond the funding period and involvement of the new generation of scientists into these networks and the integration of Eastern European countries as partners.
- On a negative side, the review panel considered that the translational objectives of the programme were to some extend limited as the transition from bench to bedside leading to potential new therapies were limited. Besides, the programme also lacks interaction with patient organisations. In this sense, it is also recognised that this was probably too ambitious for a three-year programme.

Humanities

In terms of scientific outputs, 'very good' results were achieved and are documented in publications. Although results varied across some Programmes/CRPs, these differences were not especially significant. In terms of dissemination it was often criticised that wider public outreach was missing. However, all evaluators concluded that valuable cooperation and networking took place. This is the case even where various disciplines were involved in the programmes. Most programmes

included good training opportunities for young researchers although this was at times unstructured. On the negative side, it was noted that funding agencies often did not commit in advance to the programmes. Also, the programme duration was deemed to be too short given that a lot of administrative requirements had to be fulfilled. Feedback from our interviews was overwhelmingly positive. For example, there was a consensus among those consulted that the Humanities programme helped to internationalise the scientific discipline which lagged behind other domains in terms of the ability and opportunity to collaborate. [108]

Summary of CNCC achievements (case study)

- 'Consciousness in a Natural and Cultural Context (CNCC) is one of the earlier EUROCORES programmes. It was launched in November 2006 and ran till 2009. The programme was based on the belief that the study of consciousness constitutes an urgent scientific challenge, and that real progress in this area of research requires a collaborative effort that draws on all the available resources and manages to integrate a variety of theoretical and empirical disciplines and methods. The main objective behind the programme was therefore to provide an international, interdisciplinary platform for researchers from the humanities, social and natural sciences to build joint research projects on the nature, origins, and dynamics of consciousness.
- The strategic relevance of the CNCC programme cannot be disputed - unravelling the mysteries of consciousness is considered one of the major challenges of modern science and the topic is at the forefront of the scientific arena. But it is the fact that it was decided to take a cross-disciplinary approach to tackling the issue that has been the basis for the programme's success. Creating a framework where researchers from the different disciplines of humanities, social sciences and natural sciences could come together to build joint research projects has been extremely fruitful, both in terms of creating new networks of researchers working across traditional boundaries, but also in terms of advancing existing knowledge through the development of novel ideas and theories.
- According to the final evaluation of the Review Panel, the CNCC programme has been a remarkable success. Its main strengths, in their view, has been the cross-disciplinary cooperation and the European integration that it has fostered, not to mention the contribution to creating a new generation of young researchers with a much more multi-disciplinary outlook. The programme was seen as a pioneering initiative that should serve as an inspiration to future programmes in this field and would constitute a valuable model for any networking scheme wanting to advance research by creating links between disciplines.
- In terms of recommendations for the future, it was thought that a more structured approach to the training of junior researchers could have been adopted. Moreover, the dissemination of CNCC results was seen to be too focused on scientific communities and not enough on the public at large.
- The importance of continuing the scientific cross-disciplinary dialogue started as a result of the CNCC programme is seen as paramount for the further advancement of consciousness research.

[108] See for example http://easst.net/conference-report-horizons-for-social-sciences-and-humanities/ http://easst.net/conference-report-horizons-for-social-sciences-and-humanities/

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Life, Earth & Environmental Science

The feedback on the LEE programmes was positive on the outcomes with many review panels concluding that such projects would not have been possible without the EUROCORES scheme.

In almost all cases cooperation within CRPs worked well. On the overall cooperation within each programme, there was a mixed picture. While some review panels valued inter-CRP cooperation (in one case even between different EUROCORES programmes) in other cases this apparently did not work well. The focus on younger scientists was seen as a positive element. In terms of scientific outputs, every programme produced valuable outputs although there was sometimes a difference in the performance of the single CRPs. On the negative side, it was criticised that projects had been approved although there were problems with national funding. Furthermore, in some instances a late start of the programme caused problems.

Summary of EuroSolarFuels achievements (case study)

- EuroSolarFuels was a small and success project dealing with fundamental questions on how to solve the current energy crisis. EuroSolarFuels address the problem of how to store energy from the sun. Besides the fundamental importance of the subject of the programme for the environment and society as a whole, another reason for the successful application of the project was the efforts of the PLs to involve national agencies right from the beginning. By keeping national funding bodies in the loop the two-tier application procedure did not cause problems in the application procedure.
- The overall feedback and comments in the interview process indicate that communication between the different participating researchers was excellent. Particularly the young researchers efficiently exchanged views due to the flat hierarchies and the support of the ESF coordinator. Furthermore, they also established long-lasting relationships. All interviewees mentioned that they are either in the process of applying for new funding with the same researchers or are already working with them on follow-up programmes.
- In addition to that, both PLs valued the investigator-driven nature of the Eurocores programme which they regard rarely to be the case for research funding schemes. Both PLs argued that tackling fundamental problems is not directly relevant for industry but provides the foundation for any applied science and further research. In this regard all interviewees regret the closure of Eurocores.
- Inter-disciplinarity was regarded as very important for the research as such but particularly younger researchers also saw it as a challenge since solutions to various problems are different depending on the discipline. Nevertheless, the PLs did not find inter-disciplinarity to be a problem due to their long experience. Furthermore, they argued that it is important to expose younger researchers right from the start to expose them to other ways of solving problems. Additionally, the PLs mentioned that while inter-disciplinarity is always considered to be important EUROCORES is one of the few funding schemes that adhere to this virtue.
- Funding caused some problems during the programme period. A first problem was that a research team from Hungary was not able to participate in the programme since the national funding organisation rejected its application (even though it passed the EUROCORES review panel). In addition to that, the funding did not start at the same time delaying the projects and leading to uneven progress among the different teams.

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Physical and Engineering Sciences

Although the programmes varied in terms of topics and disciplines, the feedback was similar. On the positive side, the review panels acknowledged impressive outputs in the forms of publications and follow-up cooperation between the CRPs. In addition, most evaluators concluded that training opportunities for young researchers were beneficial. Ultimately, cooperation/networking worked well. On the less positive side, it was suggested that dissemination was mainly limited to the scientific community and did not reach the wider public.

Summary of SONS 2 achievements (case study)

- The Review Panel provided a very positive final review on the SONS 2 programme, and commented in the final report that SONS 2 "has been very successful in bringing together world-class research groups and in producing high level and innovative scientific achievements." [109] Broad ranges of scientific topics were covered and topics within the area of supramolecular approaches to functional materials and generated a substantial amount of both fundamental and applied knowledge.[110] The programme involved high calibre of researchers and scientists. Participants enhanced and utilised the available resources across Europe, which had a very positive impact on the various topical domains under examination.
- Moreover common publications were facilitated by various networking activities and different conferences, symposia and workshops had a significant impact on the fundamental research, and the achievements of the CRPs. The review panel rates the dissemination of the research from 'very good' to 'excellent'.[111] Generally, SONS II succeeded in significantly contributing to the European research portfolio and was seen as a well-focused and well-organised programme. It facilitated future innovative ideas and further developments by bringing together leading European researchers.

Social Sciences

ECRP was established before EUROCORES but then became part of the scheme. ECRP was designed to promote collaboration between social scientists in Europe. Negative feedback was limited to financial and procedural aspects of the programmes (e.g. application procedure, national funding agencies reluctance to commit to programme, etc.). There was also some criticism of variations in the peer review quality. Nevertheless, outputs and scientific impacts were evaluated as being positive.

[109] ESF EUROCORES Programme Self-Organised NanoStructures (SONS) II Final Report
[110] Ibid.
[111] Ibid.

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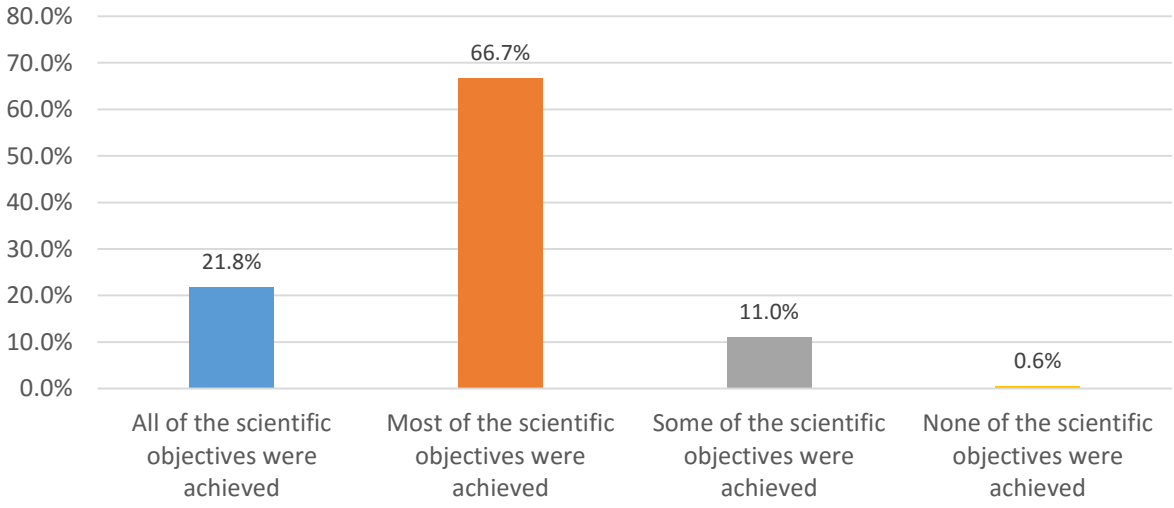
Summary of EuroHESC achievements (case study)

- The EuroHESC Programme focused on the relationship between higher education and society. It originated in a relatively small field of research on the growth of higher education taking place during the last two decades and its implication. Specifically, it had the objective to investigate social impacts. [112]
- Our research on the EuroHESC programme suggested that despite some administrative and coordination difficulties, results and impacts were broadly positive. But some contrasting views existed with regard to the quality of academic research promoted by the programme. In terms of programme's results, each EuroHESC CRP published several scientific papers, and all four were involved in dissemination activities such as workshops, training courses and conferences.[113] The majority of EuroHESC research publications still had to be published by the end of the programme and very limited dissemination activities had been accomplished.

In line with the conclusions of the programme evaluation reports and this study's case studies, the results from our research indicates that the EUROCORES programmes performed well in achieving their scientific objectives with 88.5% of respondents indicating that most or all of the scientific objectives of the research were achieved.

Figure 3.11: Overall, to what extent did the EUROCORES programme achieve its scientific objectives?



Source: Survey 1

To the extent that there were shortcomings in achieving programme objectives, these seem to have stemmed mainly from what was regarded by EUROCORES researchers as under-funding by national agencies and/or the relatively short timeframe for the completion of projects. This observation was supported by the interviews. As noted earlier, the fact that within the CRPs, some

[112] Higher Education Looking Forward. Final Report.
[113] EuroHESC Programme: Highlights Report.

projects had different start and end dates was also a complication that made it difficult to coordinate projects and ensure that the planned outcomes were achieved according to plan. Examples to illustrate these and other points are given below:

Examples – feedback on achievement of programme objectives

- "Very productive - three research papers in international journals, and multiple conference papers."
- "Most scientific problems are open ended. They are not yes-no questions and specific goals are not achievable - progress just opens new questions. Programme was successful in growing the community working on these problems."
- "One cannot say that "All of the scientific objectives were achieved" since the overall funding was too low for being able to do so. But the programme was successful in achieving many of the goals."
- The budget given by the national agency was very small and strongly limited a successful development of the project."
- "The major scientific objectives were to have a set of shared values established between the two CRPs and to fill in the concept of a responsive matrix for further exploration. This is what we did, and it actually worked out beyond expectations."
- "The ability of the program to meet all of our goals was badly damaged by the global economic collapse. From that point on, we did not have the networking funds we needed. This loss of funding was particularly damaging for my project because so many researchers were involved and because they were scattered in so many different countries."
- "As a team, we were able to arrive as unexpected new answers and to produce serious new findings that have (at least for us) changed the nature of our understanding of the phenomenon we studied. I expect our forthcoming publications to contribute to a major change in how the field views this phenomenon, as well."
- "The objectives of the original proposal could not be met because crucial groups and expertise were rejected by the review committee. What was left had some redundancy. In spite of this I believe the 4 individual programs achieved well, but lacked the added value that was obvious in the original proposal."
- "Three years is a too short time to be able to organize a program with these goals and dimension, which is why it is almost mandatory at the end of the cycle to need to extend the presentation of results beyond the allotted time."

Source: surveys

Most of those we received feedback from argued that EUROCORES had made a 'very' or 'fairly' significant contribution to scientific knowledge:

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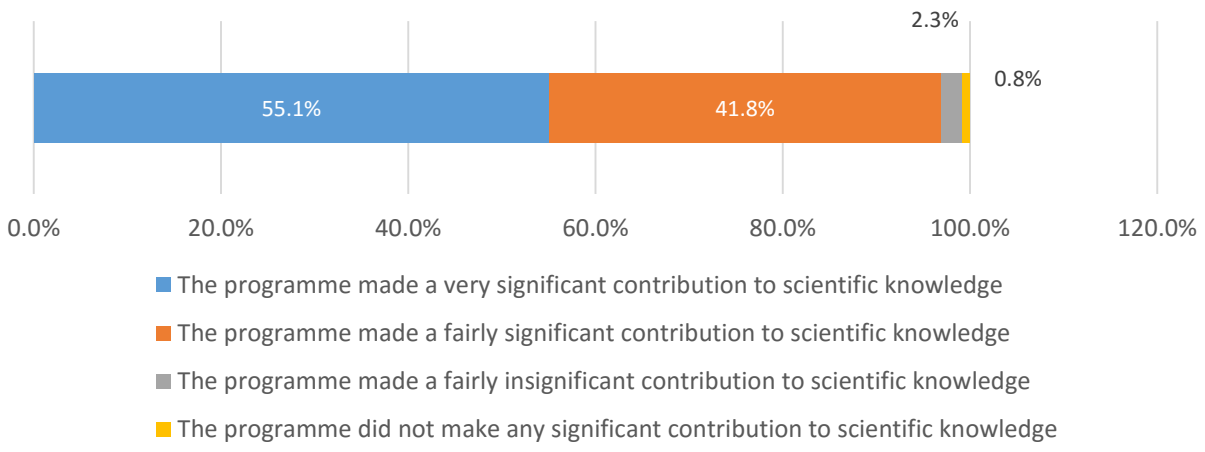
FIgure 3.12: What contribution did the EUROCORES programme make to scientific knowledge?



Some examples of the scientific outcomes given by the survey respondents are shown below:

Examples - contribution of EUROCORES programme to scientific knowledge

- "We published the first and unique set of data from glacial archives."
- "The programme has contributed significantly to European scientific leadership in the field of integrated solid earth science."
- "The project part carried out in my lab by the project-funded PhD student resulted in a paper (highlighted Faculty 1000 Biology) published in journal with impact factor over 10 and several follow-up papers resulting from subsequent projects."
- "We provided not only a new morpho-batymetric map of the Gulf of Cadiz but made available the data in digital format as xyz for future upgrading. Moreover we discovered a huge fault, 600 long, and the details of the active faults of the whole area. These information are crucial for the risk assessment of this are because prone to tsunamis."
- "The programme brought together scholars, research-traditions, approaches, from all corners of Europe and stimulated them to put questions to regional development, dynamics and cohesions that were fairly new, in some cases seemed even impossible. By working in changing pairs comparison was strongly enhanced, and new knowledge and insights were gained."
- "Our research project gave rise to a number of articles in leading journals and laid the foundation for further funded projects. I know other EuroDIversity projects achieved similar outcomes."

Source: surveys

In addition to key academic achievements, our survey findings also indicate that over one-fifth of EUROCORES projects (21.7%) led to a breakthrough discovery. EUROCORES facilitated new physical

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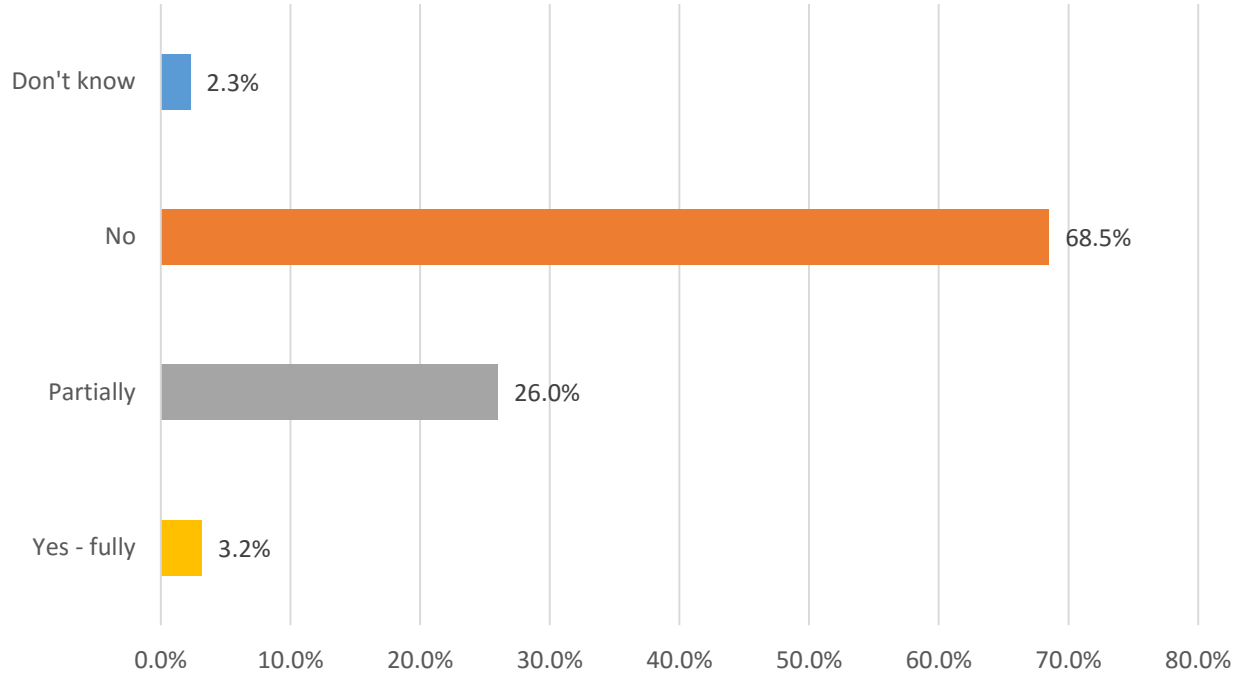
research facilities/centres in Europe. The scheme was in some instances also successful in enabling industrial application of research – through new product licences, spin out ventures, and patents.

3.5 EUROCORES critical success factors and added value

Very few survey respondents felt that the scientific outcomes from EUROCORES programmes and projects could have been achieved without the transnational dimension – only 3.2% of those completing the questionnaire argued that this would have been possible. In contrast, over two-thirds (67.4%) said that the outcomes could not have been achieved without the translational dimension with the remainder saying this was partially so (26%) or they did not know (2.3%).

Figure 3.13: Could the same programme outcomes have been achieved without the transnational dimension?



Source: Survey 1

Our interviews underlined the positive consequences of cross-border EUROCORES collaboration, both in terms of gaining access to different research data for European wide comparison but equally to broaden the expertise of those involved in the projects. As mentioned above, many researchers in the Humanities field highlighted the lack of opportunity to work with colleagues from other countries prior to their involvement in EUROCORES and how the internationalisation of research activities greatly benefited research in their field. Some more examples of the feedback are provided below:

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Examples – importance of the transnational dimension

- The quasi-experimental field study design would not have made sense if limited to a single country
- It would have been impossible to collect these numbers of patients with common and rare epilepsies without a European-wide collaboration, which included actually many more countries than those participating and funding the EUROCORES programme.
- The major outcome, "the SWIM multi-beam compilation" map is the result of 19 different surveys carried out by teams belonging to 14 different research institutions of 7 different European countries."
- Without the transnational dimension, we would not have had the mix of scientific disciplines that allowed us to produce innovative ideas, which we have continued to use and develop in the years since the end of our ESF program."
- The challenge of a responsive matrix is formidable, and we managed to attract the motivated scientists across Europe [sic]. No single country could have done this alone. At this very moment, we are also starting to publish novel results with the chair of the selection panel, who got interested in the topic. Very advanced exploration at the boundary of current scientific knowledge."
- The skills (theoretical gw calculations) were not available in UK. I was able to link with Italy because of the Fone project and also able to disseminate for the use of the UK community. Additional travel trips facilitated this."
- Using the expertise of US comparative psychologists was essential to progress in understanding human metacognition."
- Science is very flexible and is usually able to adapt to the funding situation. Thus, many of the result would probably have been obtained also without the programme. However, in many cases not so quickly, and speed is often quite important."
- Some projects did not rely on partners from other countries."

Source: surveys

There was similar feedback on the importance of the interdisciplinary aspect of EUROCORES projects and programmes although the proportion of survey respondents saying that this was vital to the achievement of objectives was less (53.7%) than in relation to the same question about the transnational dimension (67.4%). To take some examples of the feedback: one person claimed: "The mapping of the active faults was only one of the aspect of the research. Another important issue was the dating of the active fault and this could be done only with inter-disciplinary approach"; another explained: "The subject matter (e-participation in various forms and subject/policy fields) lies at the intersection of a several disciplines"; and to take a third example: "It was the unusual mix of disciplines in my project that made possible our successes. By bringing together the various disciplines to work collaboratively on the same scientific problem new ideas emerged. I do not believe that would have happened if I had designed a project that only included scientists from my discipline."

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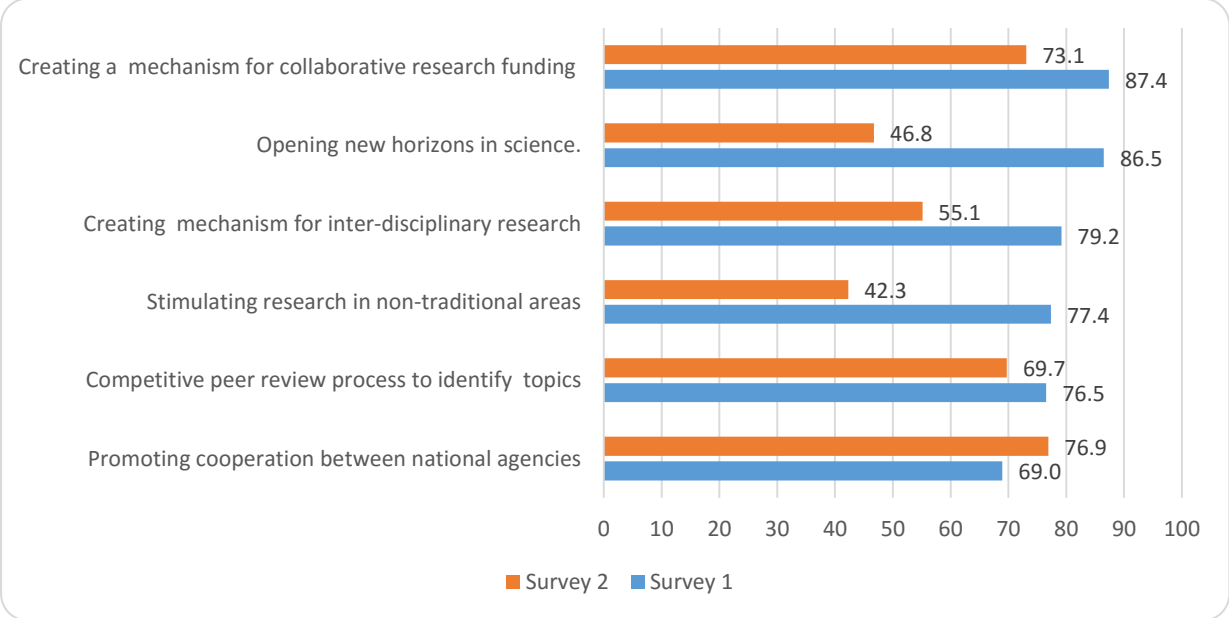
In relation to the 'non-scientific' objectives of EUROCORES programmes and projects, the feedback from the research was equally favourable with a quarter (25.5%) of the survey respondents saying 'all' non-scientific objectives had been achieved and most others (58.5%) indicating that this was partially the case. One person noted that: "Networking, training and short visit grants provided the "oil", smoothening the functioning of many consortia"; another survey participant explained that: "We had a EUROCORES programme with two CRPs and halfway into the project we found out that we had a lot in common and decided to do all meetings together to forge a community. This went very well and was a major achievement of EuroSolarFuels"; a third person argued that: "The networking aspect was extremely important also in view of new collaborative ideas following up on the research questions/results elaborated during the programme. In this sense, the EUROCORES programme felt like a pioneer enterprise."

As noted earlier, networking seems to have been especially important for younger researchers. Thus, according to one survey respondent: "Judging from our project, training and networking opportunities and outcomes were terrific and very career enhancing for junior investigators"; another argued that: "The training, including summer schools, exchange of researchers, and self-organisation of young researchers, has been very successful."

In addition to their specific objectives, there is also the question of how EUROCORES projects and programmes contributed to the overall aims of the scheme. Below we highlight the survey feedback on how programmes contributed to the various general aims of the scheme. The chart shows the responses from both those involved directly in EUROCORES-supported research ('Survey 1') and those involved in EUROCORES management ('Survey 2). It is limited to an analysis of responses indicating a positive contribution (i.e. where a contribution was made 'fully' or 'partially'):

Figure 3.14: To what extent did your programme achieve the following scheme objectives?



Source: surveys

3. Assessment of EUROCORES Performance

The views of the two key stakeholder groups did not coincide: those directly involved in research ('Survey 1') were generally far more positive about the role of EUROCORES is promoting key objectives The exception was on the question of promoting cooperation between national funding agencies. Three-quarters of the surveyed policymakers agreed that EUROCORES was effective in promoting cooperation between Europe's national funding agencies. EUROCORES developed a system that, despite its imperfections, succeeded in balancing these interests and there are many lessons to be learnt that apply more generally.

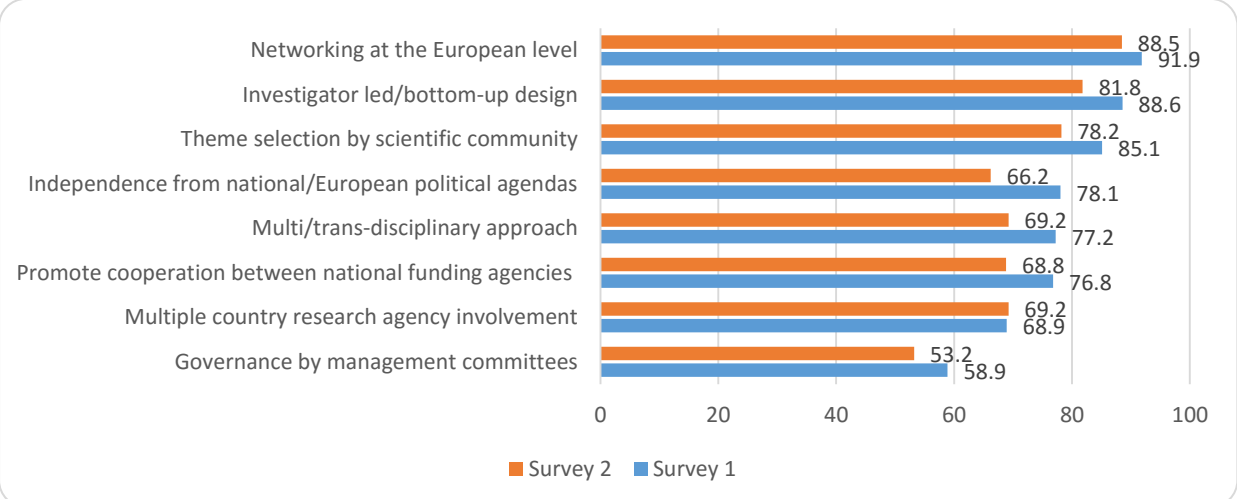
The ranking of different factors was also different, this being most apparent on questions relating to 'opening up new horizons in science', creating a mechanism for inter-disciplinary research' and 'stimulating research in non-traditional areas'. Whereas these factors were the most significant for researchers in terms of promoting overall EUROCORES objectives, for those involved in the scheme's governance, features related to the mechanisms for promoting cross-border research were more important. These differences in the relative importance of the various factors are not surprising given the differing roles played in the schemes.

When EUROCORES participants were asked whether other pan-European instruments such as ERA-Nets, COST and FP7/Horizon 2020 would have led to similar outcomes, neither of the collaborative instruments rated strongly. FP7/Horizon 2020 funding was rated as being much more likely to have produced similar outcomes than ERA-Nets or COST. The survey results indicate that the research community have a different perspective to policy makers on the how well other collaborative instruments substitute for EUROCORES.

Contribution of EUROCORES scheme features to outcomes

As part of the survey we asked about how important various aspects of EUROCORES were to stimulating high quality research and positive scientific outcomes. Below we rank these factors in terms of the proportion of survey respondents saying that they were either 'very important' or 'important'. The chart shows the responses from both those involved directly in EUROCORES-supported research ('Survey 1') and those involved in EUROCORES management ('Survey 2).

Figure 3.15: How important were various aspects of EUROCORES to stimulating high quality research?



3. Assessment of EUROCORES Performance

Source: surveys

In general, the views of those directly involved in EUROCORES-supported research ('Survey 1') were more positive than EUROCORES scheme management ('Survey 2'). Otherwise, the ranking of different aspects of EUROCORES in terms of importance to stimulating high quality research in Europe was broadly similar.

As can be seen, 'networking at the European level' and the 'investigator-led, bottom-up design' of EUROCORES are seen as the features of the scheme that contributed most to successful outcomes. In contrast, 'governance by the scientific committee and management committees' along with 'multiple country research agency involvement' were ranked as least important to stimulating high quality research. In other words, the science driven, transnational character of EUROCORES was more important than institutional aspects of the scheme. Some of the views on how important various aspects of EUROCORES were to stimulating high quality research are presented below:

Examples – Feedback on how important various aspects of EUROCORES were to stimulating high quality research

- "As a scientist we are mainly interested in funding for interesting science that works. We probably do not care too much, if the European agencies cooperate, unless it opens a new line of funding."
- "It is important that such scheme stays in the hands of the scientific community and is not under any political agenda. There are many other European schemes that are more top-down to leave Eurocores as a bottom-up scheme."
- "Currently there is no scheme such as EUROCORES available for the European research communities. In the field of Earth Sciences, the EUROCORES scheme has significantly enhanced its global competitive power. In terms of bottom-up community building, the scheme is a true asset, also in view of its impact on the young researchers participating in it. It is essential to not lose the current momentum generated by these schemes. In this context designing a follow-up of EUROCORES for bottom-up coordination of national research efforts in a European framework should be a high priority for the national research councils of Europe."
- "There is in general way too much emphasis on "governance and management" in particular in collaborative projects. Most of that is waste of time and paper and may be of use/importance if at all ONLY in cases where the collaboration fails at the scientific level anyway to limit damage. I believe it is misconception that scientists are unable to cooperate unless they have formal management structures and reporting procedures or that cooperative research is improved by elaborate cooperation agreements and management committee meetings."

As noted earlier, EUROCORES programmes had quite short timescales and within the programmes, there were often differing start and end dates for individual projects. This meant many outcomes will have only become apparent after programmes and projects came to an end. Other outcomes, e.g.

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impacts on policymaking were by their very nature only likely to come about after the end of programmes.

The table below provides feedback from the survey on the longer-term programme outcomes. As can be seen, a significant proportion of responses suggest that EUROCORES-funded research was of sufficient relevance and quality to win further national funding (54.4% of responses) and/or led to continued cooperation through networks/partnerships (65.5%). Project participants from SONS2, for example, went on to conduct research under the FP7 projects MOLISOL, CELLO, and ORION.

Table 3.5: Since completion of your EUROCORES programme, which (if any) of the following outcomes have been achieved and are attributable to your participation in EUROCORES?

Answer Options	Response %	Response No.
Peer reviewed article or book chapter	92.1	581
Established ongoing research networks/partnerships	65.5%	413
National research funding	54.4%	343
National media coverage	24.7%	156
Other EU research funding	22.5%	142
Breakthrough research discovery	21.7%	137
Academic prize	13.2	83
European media coverage	13.5%	85
Other/private foundation research funding	11.7%	74
ERC research funding	7.9%	50
Had a significant impact on policy and/or changes in practice	6.7%	42
Established physical research facility/centre	4.9%	31
Patent filed	3.5%	22
Established a spin out commercial venture/activity	1.1%	7
Registered a new product license	0.3%	2

Specific comments in response to this question also included:

Examples – Feedback on specific outcomes achieved and attributable to EUROCORES

- "An ANR program was funded on the French aspect of our research on a wide historical period. A new program is conducted in Norway, with some partners of the Eurocores."
- "The programme was supremely valuable for the young PhD and post-doc researchers involved: it provided the opportunity for a tremendously talented PhD student to establish himself in an exciting emerging field, and to build a large network of international links; and it allowed a young post-doc to consolidate his expertise and experience in an internationally collaborative context."
- "Poland built up a national effort, which would have not be possible otherwise. MPI set up a solar fuels institute, and Glasgow made a concentrated effort in the UK. NL gave its biosolar cells consortium a national dimension. The responsive matrices were the most significant scientific breakthrough, from various perspectives breakthrough."
- "It did not lead to immediate funding, but I take it as a real breaking point in my career. I

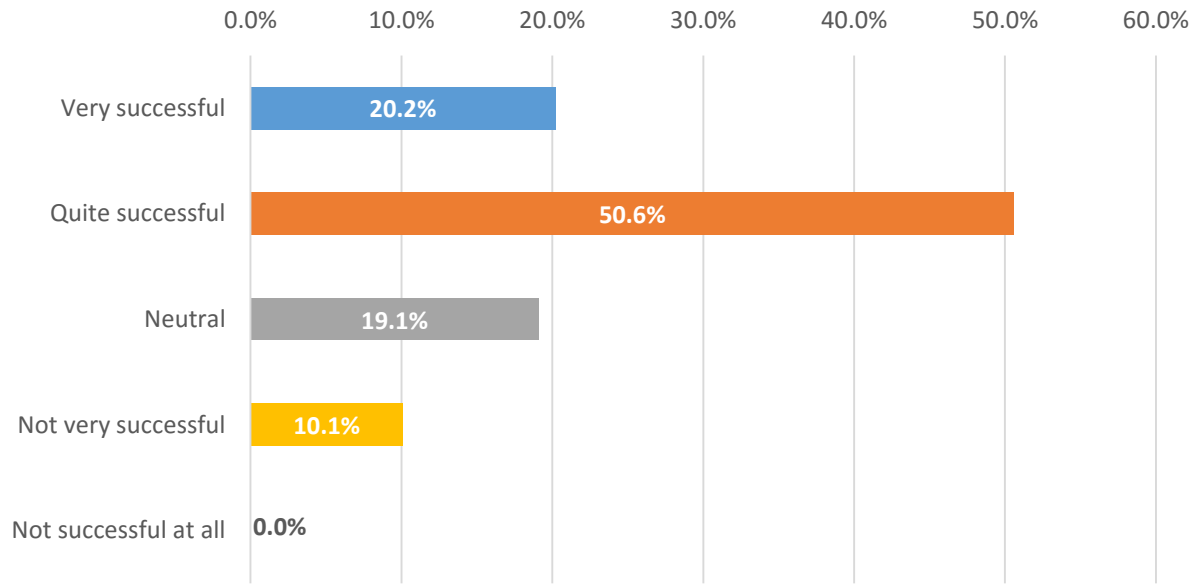
attribute it to the fair selection process of the projects, including possibility to respond to the referees."

- "It's difficult to term one's own discoveries "breakthrough", but through the cooperation, I made a rather big advance though somewhat later."

Source: surveys

The survey feedback from those involved in the governance of EUROCORES, and who were in a position to adopt a strategic view of the scheme's role, indicates that it was viewed as being successful in promoting collaborative research in Europe and beyond:

Figure 3.16: Overall, how successful has the EUROCORES scheme been in promoting collaborative research in Europe and beyond?



Source: Survey 2

The survey feedback suggests that the 'bottom-up' character of EUROCORES is seen as having been the main feature that distinguished it from other programmes in Europe. At the same time, this was both a strength and weakness with the limited commitment of national funding agencies making it difficult for EUROCORES to operate successfully. (In fact, there was very similar feedback to a related question on the role of the EUROCORES scheme in promoting co-operation between research funding agencies in Europe and beyond (10.2% saying the scheme had been very successful in this respect with a further 44.8% saying it had been 'quite successful').)

The quote below, supplied by a EuroBioSAS review panel member, is one concrete illustration of the consequences when national funding agencies were unable or unwilling to support EUROCORES this could (severely) affect the programmes.

"The EUROBioSAS programme was conceived as a pan-European programme that was intended to

bring together project partners from a large number of participating countries including the key players of DE, UK, FR, CH, and NL in this field. In the event, several of these key nations were unable or unwilling to participate, with the result that the eventual programme was at the very edge of viability when launched. In my opinion, EUROBioSAS has successfully achieved the limited potential with which it was left when launched, but has come nowhere close to achieving the aims of the programme as it was originally proposed. Thus, although the individual CRPs have made very good – and in some cases excellent – progress individually, the programme itself has in my opinion proven to be only a little more than the sum of its parts. I do not think that there is much that could have been done to improve this situation, short of securing contributions from the key European nations. […] EUROBioSAS has worked as well as could have been hoped for at the time it was launched, but has not lived up to the hopes that its proposers had when the programme was first proposed. This represents no fault on the part of any of the CRPs, but rather reflects the structural difficulties inherent in integrating scientific activity across Europe's many nations. Nevertheless, it is clear that the EUROCORES scheme occupies a valuable niche within the European science base, and the reports of all 3 CRPs point to the benefits of facilitating transnational activity in the basic – as opposed to applied – scientific research, for which the EUROCORES scheme provides."[114]

These and other points are highlighted in the examples of feedback provided below:

Examples – feedback on success of EUROCORES scheme in promoting collaborative research in Europe and beyond

- "From scientific [sic] viewpoint a successful scheme as counterweight to the EU-Commission approach to collaborative funding."
- "Other schemes are able to promote collaborative research in Europe and beyond, but the EUROCORES scheme was successful in getting national resources to converge on subjects of common interest, selected through a competitive peer review process."
- "Despite its success stories, Eurocores [sic] have disappeared, therefore it is a failure. The EU flagships are a kind of successor but is a different story, which turned into an intellectual failure."
- "The limited commitment from the funding agencies was a barrier to the success of this scheme. Moreover after the end of the EU Grant the extreme high cost of the management also detain the ambition of the scheme."
- "Some countries did not dedicate real new money to the scheme and therefore renamed some of their national funding to match the Eurocores [sic] programme (researchers being told that the money given to Eurocores [sic] meant they would not receive national funding already allocated).
- "The scheme never really succeeded in creating a "common pot" approach. As a result, it supported nationally based research instead of truly opening up the European Research Area."
- "Very successful in the period it was allowed to exist. The financial crisis killed the European ideals."

Source: surveys

[114] Review Panel Member EuroBioSAS

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Reflecting these and other arguments, quite a high proportion of the survey respondents (40%) argued that the decision to terminate the EUROCORES scheme was correct (34.44% said 'no' and the remaining 25.56% did not have an opinion). Those saying that the decision was right tended to emphasise that other research collaboration schemes (in particular, ERA-NET) had effectively replaced EUROCORES. As one survey respondent explained:

> "Originally, when the support of European Commission was available the EUROCORES scheme was very efficient and it´s real advantage was that the topics of collaboration were established after a fair discussion between participating organizations. Later, without the support it started to be more complicated to run the scheme and also principles of EC framework programmes has changed towards grants given to consortia of collaborating teams from many countries (something that EUROCORES had started many years ago)."

Other comments appeared to echo the sentiment that EUROCORES had served its original purposes. For example, one person argued that: "The scheme has been very useful and successful and it triggered similar cooperation mechanisms at European level. As such it had somehow exhausted its objectives." A third comment added that: "The scheme has been superseded [sic.] by an increasing number of bi- and trilateral agreements". There were many comments similar to this.

4. Key Evaluation Issues

In this section we provide an assessment of key evaluation issues – relevance, effectiveness, efficiency, impacts and added value.

4.1 Relevance to key stakeholders

We start by examining the extent to which the EUROCORES scheme's activities were relevant to the needs of key stakeholders. A related issue is to what extent different projects complement each other (internal coherence) and taking the EUROCORES scheme as a whole, how coherent it is with the activities and polices of other EU and Member State schemes (external coherence).

EUROCORES' key stakeholders were national funding agencies, research councils, research academies, and foundations across Europe), the scientific community and the ESF.

4.1.1 Member Organisations

There are several aspects to be considered in assessing the relevance of EUROCORES to the MOs.

Firstly, a key question is how relevant the EUROCORES scheme was to the MOs in terms of adding value to their own national research funding programmes and other international schemes. In the interviews with MO representatives the relevance of the scheme was mainly ascribed to its role in promoting international networking. In this way, the reach of national research could be internationalised. This was an especially important consideration for countries with less well developed research capabilities where the opportunity to collaborate with leading researchers and to achieve a transfer of know-how was an attraction of the scheme. From this perspective EUROCORES was less relevant to some of the larger Member States with already well developed research capabilities which could of course explain why a number of the larger countries were regularly unwilling or unable to support projects under the Scheme (e.g. Germany, UK).

Secondly, the research suggests that the relevance of the EUROCORES scheme also lay in helping to strengthen bilateral relationships between MOs themselves. In general, participation in EUROCORES helped MOs to network and develop personal contacts. Specific benefits of such networking mentioned by MOs included gaining a better understanding of the research funding arrangements in other countries. Even in countries where collaborative research traditions already existed, EUROCORES did help to further develop experience and know-how amongst the personnel of national funding agencies working together. In particular, it helped to develop and disseminate good practices in managing collaborative research, for example with regard to appraising proposals for funding through the dual process involving a peer review and the dialogue between researchers and reviewers. This know-how was then later also applied to other international funding schemes (e.g. ERA-Nets).

However, as can be seen from the following table, despite the tendency of bigger research countries to downplay the relevance of the EUROCORES, overall the MOs appear to recognise the value of the scheme to researchers. The table below shows responses from Survey 2 (Management Committee contacts) suggesting that MOs recognised that the investigator-led, bottom-up design of EUROCORES was a key feature, as was the promotion of networking at the European level:

4. Key Evaluation Issues

Table 4.1: EUROCORES has a number of distinct features and values. Please rate the following aspects of EUROCORES in terms of how important they were to stimulating high quality research

EUROCORES features	Excellent		Good		Neutral		Poor		Very Poor		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Bottom-up design	31	34.1	42	46.2	14	15.4	3	3.3	1	1.1	91	100
Networking at the EU level	37	40.2	43	46.7	10	10.9	1	1.1	1	1.1	92	100
Theme selection by scientists	27	29.3	42	45.7	18	19.6	4	4.3	1	1.1	92	100
Multi -disciplinary approach	18	19.6	45	48.9	24	26.1	3	3.3	2	2.2	92	100
Multiple agency involvement	16	17.4	49	53.3	21	22.8	4	4.3	2	2.2	92	100
MC governance	14	15.4	34	37.4	34	37.4	8	8.8	1	1.1	91	100
Political independence	24	26.4	34	37.4	25	27.5	5	5.5	3	3.3	91	100
Linking national agencies	19	20.9	41	45.1	18	19.8	9	9.9	4	4.4	91	100

Source: Survey 2

It is clear that there were wide differences in the attitudes of funding agencies towards EUROCORES. These differences are not only evident over time (in terms of EUROCORES implementation) but also across countries, the EUROCORES scientific domains, as well as different MO representatives providing feedback. Generally, smaller EU Member States viewed the role of EUROCORES more positively than the larger Member States that were better placed to promote international research collaboration without the scheme.

4.1.2 Scientific Community

Turning to the scientific community, our findings suggested that EUROCORES was a highly relevant measure to promote research collaboration across scientific disciplines at the European or even international levels. For researchers, EUROCORES had the advantage of having a 'bottom-up' focus that was driven by scientist themselves and their priorities in basic research.

This conclusion is strongly supported by the survey responses. For instance, one survey respondent stated that "It was a great chance to broaden international contacts." Another stressed this aspect even further by mentioning that "I could not have collaborated with colleagues in Austria/Italy otherwise". In more in-depth interviews with scientists in was also argued that the bottom-up approach of EUROCORES was unique in Europe. For instance, it was mentioned by scientists involved in the EuroSolarFuels Programme that independent bottom-up research is necessary to ensure the quality and sustainability of science. Therefore, they saw it as the main strength of EUROCORES. Some researchers also stressed the inter-disciplinarity of EUROCORES as a strength of the programme. As one survey respondent argued: "The scheme looked interesting and promised a fruitful interdisciplinary outcome".

Our findings indicate that participants involved in all scientific domains considered EUROCORES to be a relevant or highly relevant scheme. In particular, we received extremely supportive feedback from the Humanities research community with regards to the relevance of the Scheme.

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4.1.3 Overall relevance and coherence

Taking the issue of internal coherence first, the way EUROCORES worked in practice was not fully aligned to an investigator-driven, 'bottom-up' approach. As one survey respondent argued:

> "The system where national funding organizations have [sic] final word in decision making created an invisible third round of evaluation. This was not only unfair but harmful to the work of the research program [sic]. Good projects were rejected because of bureaucratic rules that were totally unnecessary."

As a result, there were significant challenges in obtaining financial buy-in for EUROCORES projects at a national level, which significantly hampered or effectively cancelled a number of successful project proposals.

With regard to the overall aim of encouraging networking, the feedback suggests that in practice EUROCORES was designed to meet the objective of bringing researchers together. For instance, networking events were organised at the start, during and at the end of programmes and funding was available for the organisation of these events. In general, and with a few exceptions, collaboration between researchers in the EUROCORES project partnerships seems to have worked well. This was the view of the overwhelming majority (91.1%) of the survey respondents.

Inter-disciplinarity was encouraged in EUROCORES programmes but it was perceived to be less relevant than the other features of the scheme. It could also be argued that inter-disciplinarity had a somewhat different role as a scheme objective. One motivation for promoting interdisciplinary research collaboration was, according to an interviewee "the belief that the themes having the necessary scale and scope are complex and large enough to become EUROCORES Programmes needing meaningful involvement and scholarly views from more than one discipline". Beyond this, the rationale for inter-disciplinarity was rather limited.

Examples showing that a transnational dimension was indeed relevant to the various EUROCORES Programmes were provided both in the interviews and survey. In some cases EUROCORES enhanced and enlarged already existing transnational relationships. For instance, most of the key researchers in the EuroSolarFuels programme already knew each other. In an interview with several researchers it was, however, mentioned that the relationship with other researchers was strengthened and led to continuing cooperation after involvement in EUROCORES ended. In several other cases EUROCORES helped to develop new and lasting relationships among scientists (particularly PhD and postdoctoral researchers).

Another issue is whether collaborative European research was indeed needed. One example illustrating the importance of transnational cooperation was EuroDEEP where cooperation between different countries helped to fund expeditions to deep-sea areas and to carry out the research in various countries that was needed to provide comprehensive coverage of the subject. Also in respect to other programmes, researchers stressed the importance of transnational cooperation. For instance, one survey respondent mentioned that "the quasi-experimental field study design would not have made sense if limited to a single country". Another respondent mentioned that "It would have been impossible to collect these numbers of patients with common and rare epilepsies without a European-wide collaboration, which included actually many more countries than those participating and funding the EUROCORES programme." Very few survey respondents felt that the scientific outcomes of their particular programmes and projects could have been achieved without the transnational dimension – only 3.2% of those completing the questionnaire argued that this would have been possible.

Since EUROCORES did not aim to evenly distribute resources between countries or domains, we cannot evaluate the scheme in these terms. The aim of EUROCORES instead was to focus on any subject which demonstrated a need for international cooperation and which was truly excellent research. Consequently, in order to assess internal coherence it is necessary to assess whether the output of the projects indeed

reflected truly excellent research. Furthermore, the transnational nature of the projects needs to be assessed. As can be seen in Section 3, the data collected to date indicated an impressive overall output of the scheme, in particular with regard to scientific outputs. However, despite its basic research focus, EUROCORES supported the creation of patents and other industrial applications as well.

4.1.4 Coherence of EUROCORES in comparison to national or EU initiatives (external coherence)

As we have outlined in Section 2, there were few if any programmes that are directly comparable to the EUROCORES scheme at the European level. Certainly, EUROCORES was initially established to fill a large gap in the funding opportunities available to researchers and this largely remained the case throughout its lifetime. The degree to which funding agencies in Europe supported 'bottom up' research varied across countries but overall the available support was quite limited (in AT, DE, CH) and did not involve an emphasis on cross-border collaboration.

Having said this, with the closure of EUROCORES, the research community is likely to adapt and to adjust the content and focus of their future proposals to the specific scope of the funding programme to which they are applying (e.g. include or highlight possible industrial applications or adjust the team involved in the research to better suit the objectives of the funder). This is a natural reaction to the choice of funding options that is available. Of course, if one funding programme disappears, there will be increased competition for the remaining opportunities.

In terms of funding basic, interdisciplinary and cross-border research, COST Actions are the most similar to EUROCORES. Feedback from our research suggests there are a number of former EUROCORES projects that are now preparing COST Action proposals as a result of the closure of EUROCORES. Another former EUROCORES project is preparing a proposal to submit to a Mediterranean INTERREG programme (EU Structural Funds) as an option of continuing to conduct cross-border research. But projects at a basic research level and projects with limited industrial application have limited options. A number of EUROCORES programmes have also gone on to secure funding from the Seventh Framework Programme or Horizon 2020 and it is quite possible the H2020 programme will increasingly become a EUROCORES substitute.

The European Research Council and to a lesser extent the ORA (Open Research Area) are other possible avenues for funding research which would previously have fitted under the EUROCORES Scheme. However, as section 2 outlines, there are clear limitations here in terms of inclusiveness – ERA grants are focused on individual researchers and the ORA is limited to a small number of countries.

4.2 Effectiveness and added value

Effectiveness can be defined as the extent to which the EUROCORES scheme achieved its specific objectives (i.e. the aims of individual EUROCORES-supported programmes and projects) and the general objectives of the EUROCORES scheme overall. Clearly, the achievement of specific objectives, taken together, determines the extent to which general goals were attained. Added value can be interpreted as the extent to which outcomes could have been achieved without EUROCORES support.

Overall, the EUROCORES Scheme can be said to have been very successful in achieving its basic aim of promoting cooperation between Europe's national funding agencies and providing support for large-scale collaborative research programmes in Europe and beyond. As Section 3 has shown, the overwhelming majority of those who participated in our research considered that EUORCORES was successful in achieving its objectives at a strategic and operational (programme) level. In the case of those directly involved in projects (Survey 1), approaching a quarter (22%) of respondents argued that the Scheme had achieved all its scientific objectives with a further two-thirds (66%) saying that most objectives had been met. There was similar feedback from other key stakeholders.

4. Key Evaluation Issues

To the extent that there were shortcomings in achieving EUROCORES objectives, these seem to have stemmed mainly from what was regarded by EUROCORES researchers as under-funding by national agencies and/or the relatively short timeframe for the completion of projects. As noted earlier, the fact that within the CRPs, some projects had different start and end dates was also a complication that made it difficult to coordinate projects and ensure that the planned outcomes were achieved according to the plan. There were also factors beyond the control of those directly involved in the EUROCORES programmes that negatively affected the capacity to achieve objectives. In particular, the onset of the financial crisis in 2008 meant that national funding arrangements for collaborative research projects were put under strain and the cessation of support for some activities mean that desired outcomes could not be achieved.

Many important scientific outcomes were achieved by EUROCORES. To add to the earlier examples, through the training of the younger researchers, exchanges and research visits and dissemination grants, and encouraging mobility across CRPs, and the sharing of samples, databases, genotypic and phenotypic information (RES, CoGIE, EpiGENet), EuroEPINOMICS led to many joint publications of high quality. Similarly, the OMLL programme opened up new research opportunities and facilities which resulted in significant scientific outputs and helped define new questions for future research. For example, EUROCORES support helped set a psycholinguistics laboratory at the University of the Basque Country (ELEBILAB) and the team there subsequently continued with experimental research and collaboration with an Italian university exploring language discrimination.

Likewise, the Inventing Europe project teams helped to establish Europe's place as a leading centre for the study of the history of technology. One of the most noticeable successes of the programme was how the organisers, who were mainly located in North-Western Europe, successfully engaged researchers from Eastern Europe, South-Eastern Europe, and the Iberian Peninsula. In the case of EuroGENESIS, smaller countries particularly benefitted as it allowed young researchers to be integrated in a research networks across Europe. The programme served as a counterpart to the Physics Frontiers Centre in the US (the Joint Institute for Nuclear Astrophysics), and helped to increase the impact of European research in the broader research areas of astrophysics and nuclear physics. Other programmes such as EuroDYNA were able to form 17 new collaborations between scientists across several thematic CRPs. EuroDYNA was also was active beyond its boundaries, forging links with EU-networks and other EUROCORES Programmes within the same discipline and across scientific disciplines.

Overall, and as with the evaluation of the FP6-participation in the activities supported after 2008 led to research that was of significant academic and scientific value. In particular, there were many citations, academic publications, conference papers and other outcomes promoting new theories, new data sets and increased researcher standing in the various domains. These outcomes are well-documented in the final reports on EUROCORES programmes.

As with the evaluation of the FP6-supported EUROCORES scheme, this study has also found strong evidence of additionality (added value), i.e. without the support of the scheme, most projects would not have been able to go ahead, at least on the same scale and with the same research objectives and partners. As noted in Section 2, at the time when EUROCORES was launched, and for many years afterwards, there were no real alternatives to EUROCORES with regard to funding 'bottom-up' cross-border collaborative research. Whilst the transnational dimension was clearly central to the Scheme and the outcomes it achieved, the inter-disciplinary aspect of EUROCORES, whilst not critical, was nevertheless a significant additional feature.

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4.3 Efficiency of the EUROCORES Scheme

Narrowly defined, efficiency relates to the ratio between financial inputs and physical outputs. From a methodological point of view, a complication is that whilst financial inputs can be quantified, this is often more difficult with the outcomes. Consequently, it is often not possible to calculate the unit cost of an output which, in turn, makes it difficult to assess efficiency (at least in a quantitative way). Closely related to efficiency is the concept of value for money, i.e. the extent to which the same financial inputs could have led to more outputs or, conversely, whether the same outputs and impacts could have been achieved with reduced inputs. In a non-financial sense, efficiency issues relate to how well a scheme operates.

In a EUROCORES perspective, the financial inputs to programmes consisted of two main elements – research funding provided by national agencies for programmes and projects and, secondly, funding from the ESF to support networking and dissemination activities.

As part of the research for this evaluation we examined the final reports on EUROCORES programmes that have been completed to try and identify these sums. To summarise:

- Of the 47 completed EUROCORES programmes, 12 produced final reports providing quite comprehensive information on national funding for research activities and on outputs;
- On average, EUR 925,000 was committed to each CRP (with a range from EUR 600,000 (TECT) to EUR 1.4m (EuroDIVERSITY) and EUR 157,800 to individual research projects (with a range from EUR 105,000 (EuroSCOPE) to EUR 411,700 (EuroDYNA);
- Taking the 12 programmes for which information is available, a total of EUR 66.6m was allocated by national funding agencies to EUROCORES research activities, i.e. an average of EUR 5.6m per programme with a range from EUR 2m (EuroSCOPE) to EUR 14m (EuroDIVERSITY). The average grant per agency per programme was EUR 545,900 with a range from EUR 330,000 (the Inventing Europe programme) to EUR 875,000 (EuroDYNA).

The table below provide a breakdown of the data we have extracted from the sample of 12 final reports. Assuming the 12 EUROCORES programmes for which financial data is available are typical of the other 35 programmes that have been supported since 2003, this would mean that during the period 2009-15, Member State expenditure under the EUROCORES scheme on research activities would have totalled EUR 263.2m (EUR 5.6m average expenditure per programme for the sample x 47).

Table 4.1: Financial inputs to programmes (EUR, sample)

Sample Programmes	Research budget (€m)	Number of national agencies	Number of CRPs	Number of researchers	Number of networking events	Number of publications
EuroCLIMATE	6.1	13	9	63	18	99
EuroDYNA	7.0	10	7	31	9	154
EuroDIVERSITY	14.0	18	10	123	14	n/a
EuroSCOPE	2.0	9	3	18	3	45
BOREAS	6.0	9	7	47	13	200
SONS 2	7.3	11	7	49	11	87
Inventing Europe	3.3	10	4	122	15	19
TECT	3.0	7	5	48	15	1,280
EuroDEEP	3.5	10	4	55	15	77
HumVIB	4.0	11	6	33	12	25

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Sample Programmes	Research budget (€m)	Number of national agencies	Number of CRPs	Number of researchers	Number of networking events	Number of publications
EuroSTRESS	3.0	7	4	34	9	39
EuroMEMBRANE	7.4	9	6	41	15	38
Total	**66.6**	**114**	**72**	**664**	**149**	**2,063**
Average	**5.6**	**10.4**	**6.0**	**55.3**	**12.4**	**171.9**

Source: ESF data, CSES analysis of final reports

Notes:

Number of participants: in the case of EuroCLIMATE, the number of participants excludes 50 PhD students while in the case of EuroDEEP there were 29 PhDs students. These were the only programmes in the sample providing information on PhD students. In other cases, Project Leaders, Principal Investigators and Associated Partners were counted, i.e. EuroSCOPE (3 PLs, 12 IPs, 3APs) and BOREAS (7 PLs, 29 IPs, 11 APs).

Number of networking events: excludes 2 outreach events in the case of EuroDYNA, 2 related events in the case of EuroDIVERSITY and the final and launch events with TECT.

Number of publications: in most cases only examples are provided (e.g. BOREAS where 200 publications are cited as examples but there were others). OMIL was the only programme in the sample to provide a full list of 460 publications. In most cases a range of different types of publications were produced. For example, in the case of SONS 2 the examples provided included 9 press releases, 9 interviews and articles in printed and online newspapers/journals and 1 outreach activity (Thermogelating video: http://www.youtube.com/watch?v=dPDmVXZHDBw). The above table does not include outreach publications such as newspaper articles, etc.

Assuming again that the sample of 12 programme examined by us is representative, this would mean that during the 2008-15 period EUROCORES supported the activities of over 2,500 researchers across Europe (an average of 55 researchers per programme for the sample x 47), over 8,000 publications and other scientific outputs (average of 171 for the sample x 47) and a total of 564 networking events (12 x 47).

As far as the funding to support EUROCORES networking and dissemination is concerned, data provided by the ESF indicates that a total of EUR 16m was provided such activities during the 2009-15 period. The following table provides a breakdown by EUROCORES programme

Table 4.2: ESF funding for EUROCORES networking and dissemination activities (EUR, 2009-15)

Programme	EUR	Programme	EUR
BOREAS	128,700	LogiCCC	574,200
CNCC	178,423	Topo-Europe	1,230,660
ECRP 05/I	73,007	BABEL	576,818
ECRP 06/II	167,100	ECRP 08/IV	240,000
ECT	212,300	HESC	574,473
EuroDEEP	176,000	MEMBRANE	819,000
EuroDIVERSITY	379,500	ECRP 09/V	295,000
EuroMARC	440,000	EuroCORECODE	409,500
EuroQUAM	437,150	EuroEEFG	791,700
EuroSCOPE	60,992	EuroGENESIS	436,800
FoNE	181,533	EuroGRAPHENE	873,600
Inventing Europe	221,550	EuroSYNBIO	600,600
RNAQuality	154,000	ECRP VI	285,000

4. Key Evaluation Issues

Programme	EUR	Programme	EUR
S3T	255,217	EuroBioSas	300,300
SONS II	311,317	EuroEPINOMICS	700,700
TECT	255,659	EuroGIGA	591,500
ECRP 07/III	87,400	EuroSolarFuels	236,600
EuroQUASAR	356,400	EuroUnderstanding	409,500
EuroSTRESS	297,000	EuroVOL	491,400
FANAS	712,079		
HumVIB	539,703	**Total**	**16,062,381**

Source: ESF

As noted in Section 2, a very basic measure of efficiency involves calculating the ratio between financial inputs and outputs, i.e. the cost per unit of output. In the case of the EUROCORES scheme, the measurable outputs include research activities (we have used the number of researchers engaged in CRPs as a proxy indicator), networking activities (conferences, workshops, etc), publications (articles, reports, books, etc) and a range of other outputs (e.g. TV appearances, patents, exhibitions).

Based on the financial inputs set out in Table 4.1 and the information on outputs in Table 4.2, the average cost per output for the 12 EUROCORES programmes was EUR 101,266 per researcher, EUR 29,086 per networking event and EUR 32,577 per publication. In themselves, there is no particular significance to these numbers because there are no readily available benchmarks to compare them with. However, a comparison can be made between the relative efficiency of different EUROCORES programmes in generating different types of outputs. According to our calculations there was some variation in the 'cost per researcher' with a range from EUR 27,049 to EUR 225,806 but most CPRs were positioned in the EUR 100,000 to EUR 150,000 band. There is a similar picture with the 'cost per publication' efficiency indicator where the range is from EUR 2,343 to EUR 194,737. In the case of 'cost per networking event', the three CPRs were within quite a narrow band but the sample is too small for a meaningful analysis. Overall, the financial ratios suggest that the EUROCORES scheme performed efficiently.

5. Conclusions & Future Options

In this section we present the overall conclusions and recommendations from the evaluation of the EUROCORES scheme.

We present our conclusions at two levels. Firstly, we present our general conclusions. These reflect the findings of the research focusing on the high-level issues, locating the EUROCORES scheme in the overall policy environment. Secondly, we discuss our conclusions pertaining to the specific issues concerning EUROCORES as a funding instrument. Last but not least, we present a number of options and our recommendations with regard to the future.

5.1.1 Overall conclusions

From the European research community's perspective, the EUROCORES Scheme filled a genuine need which has not been (sufficiently) addressed by any other funding instrument that exists today. EUROCORES was unique in promoting an independent, bottom-up approach to collaborative research in Europe that was driven by scientists and allowed new scientific ideas to be developed. EUROCORES was also important as a forum for developing medium-sized, high quality projects that enabled not only the most experienced researchers to work together but also provided support for the development of young researchers.

Although the research community recognises the need for policy-driven research funding, there is a general consensus amongst the scientists we consulted that the Horizon 2020 and other European or national funding **instruments cannot substitute for EUROCORES.** There are concerns that the closure of the EUROCORES scheme has left a gap that is particularly problematic for younger researchers, the discipline of humanities, curiosity-driven research, and smaller countries with a strategy of growing their research competence through internationalisation, and/or a combination of these factors.

The perspective of the majority of policymakers is that the EUROCORES Scheme provided a useful framework in which to learn to work together, and to develop a 'variable symmetry' form of cross-border collaboration. However, whilst acknowledging the merits of EUROCORES, there is a recognition following its closure that similar objectives can now only be pursued through other schemes. Just over a third of the policymakers interviewed considered that this form of cooperation is now better achieved through schemes such as the ERA-Net programmes. The policy-driven ERA-Nets design also reflects a broader trend in European research along with the establishment of Science Europe, focusing on policy coordination. Moreover, European research policy is increasingly focused on cost-effectiveness and the measuring of impact of research. Naturally therefore, funding agencies in Europe are increasingly wary of taking risks in their support for (bottom-up) research where there is less scope to set the agenda. However, this evaluation demonstrates that these fears are misplaced. EUROCORES compares very favourably with top down instruments in terms of impact and outputs.

Overall, according to our research, there is no consensus amongst national funding agencies on whether it was the right decision to close the EUROCORES scheme. Because of its 'bottom-up' and nationally fragmented, non-centralised character, EUROCORES was a complex instrument which required support from many actors/funding agencies who all had their own individual procedures and priorities to follow in addition to the Scheme rules. It took sustained efforts over a long period of time to establish the EUROCORES scheme as a functioning programme. This complexity created a number of challenges – some of which more at issue in certain countries or domains and some of which appear not to have been overcome, despite the continued efforts of those involved in trying to find solutions.

Another factor is that following the onset of the financial crisis in 2008, EU Member States faced increasingly severe constraints on public expenditure which proved a key obstacle to the continuing operation of EUROCORES. There was also increased competition between EUROCORES and other collaborative programmes, notably the ERA Net, for EU Member States' support. The post FP6 funding arrangement of a budget made up of national contributions and a management fee for the ESF for scientific networking and coordination was difficult to implement in practice, given the additional stress of the financial crisis. Although the idea of a 'common pot' was discussed, there was an unwillingness of some countries to pool their resources. For all these reasons, despite being widely supported in the scientific community, certain countries were reluctant to continue providing support to EUROCORES.

Moreover, some funding agencies expressed concerns that the bottom-up EUROCORES model was more fitted to the objectives of the research community rather than expressive of national research priorities. According to our research there is a preference among certain funding agencies for policy- led research activities because of a perceived better return on investment. In the end they appeared unwilling to support EUROCORES, or at least preferred investing in other programmes. From the financial perspective of the funding agencies, participation in EU-led programmes may have seemed a preferable option (politically and economically) as the European countries that are also EU Member States had 'already paid their membership fee for these initiatives', thereby providing an incentive to achieve net-benefits from EU research. EUROCORES was also perceived by funding agencies to be a relatively expensive programme. However our own analysis suggests that the EUROCORES programmes produced outputs and outcomes that were good value for money.

Last but not least, the ESF, as the managing body of the scheme, faced continuous challenges in the running of EUROCORES. The ESF was charged with coordinating and carrying out work on behalf of a large number of funding agencies which had different rules, policy preferences and priorities. The Foundation worked very hard to promote EUROCORES after the FP6 period of support and in reaching an agreement with the Member Organisations on how the Scheme would work after 2008. This was a complex political and administrative undertaking, and it ultimately proved difficult to achieve sufficient common ground to fund a viable number of EUROCORES programmes. Furthermore, compared to EUROCORES, the funding agencies had more influence in the management of the ERA-Nets (in which the partaking funding agencies also functioned as the secretariat).

5.1.2 Conclusions at the operational level

Judging by the feedback from our research, the ESF's management of the EUROCORES scheme was held in high regard. The EUROCORES coordinators, science officers and administrators played a key role in the success of the programmes. The investment in highly-skilled staff with relevant scientific background was a decision made by the ESF at an early stage and the advantages of this have been widely recognised by researchers and policymakers alike. Overall, the ESF is considered to have been a good managing agency (for this reason, we argue later that ideally it might have a continuing role in managing any new measures of a similar nature to EUROCORES – see Section 4.2). The Foundation is generally regarded to have shaped the Scheme to fit scientific needs. There were, however, challenges associated with the proposal procedures, such as the fair evaluation of interdisciplinary research. However, these are challenges likely to emerge in all funding programmes.

5. Conclusions & Future Options

Although EUROCORES scheme was not an exclusively 'bottom up' programme (Member Organisations had a key decision-making role), it provided an efficient mechanism for promoting scientist-driven collaborative research priorities. Themes and projects were selected if they were of high scientific quality and if they were of sufficient interest to the funding agencies financing the research. This had two consequences: firstly, a funding agency could – even at a very advanced stage of the proposal – veto one or more project, which then risked the whole theme/programme being stopped or fundamentally restructured. It required a great deal of understanding and insight from the funding agencies to deal with these situations; and, secondly, EUROCORES risked not funding the most high quality projects. If the funding agencies could not agree budgets for the top ranked programmes, lower rated programmes tended to be funded instead. Nevertheless, despite considerable flaws in the selection process, EUROCORES was an effective vehicle for funding projects that entailed a high degree of collaboration across countries and disciplines. The networking aspect supported by the ESF was crucial in this regard.

Overall, and as with the evaluation of the FP6-supported phase of the EUROCORES Scheme, the activities supported after 2008 led to research that was of significant academic and scientific value. In particular, there were many citations, academic publications, conference papers and other outcomes promoting new theories, new data sets and increased researcher standing in the various research domains. These outcomes are well-documented in the final reports on EUROCORES programmes. The ESF's management of the EUROCORES programme, secretariat support for CRP activities and funding of networking and dissemination was critical to achieving successful outcomes. Feedback from the research indicates that the ESF officers performed their role very professionally. The majority of those consulted considered the EUROCORES scheme to be better than most comparable EU-funded programmes in terms of management and administration. There was also an active involvement from all sides in the peer review process in EUROCORES, which was appreciated by the national funding agencies.

EUROCORES appears to have considerably strengthened a number of research fields as well as having produced a high number of scientific outputs. Many EUROCORES programmes appear to have led to significant findings and to the development of new fields of research. Equally the Scheme was effective in stimulating the formation of new research groups who produced a high number of publications and other scientific outputs and continued to work together after the funding period. EUROCORES was a particularly useful vehicle for supporting younger researchers and there appears to have been a high level of success in developing networks of young researchers from across Europe in promising new fields of research.

From a research funding perspective, the outcomes from the EUROCORES programmes and projects were generally very positive. The EUROCORES themes were highly relevant to research priorities. The research supported produced findings and impacts of relevance to science policy. The scheme was also considered to be high quality and inclusive (as oppose to focusing on excellence on a small number of researchers). Moreover, EUROCORES was designed to suit the needs of all kinds of research (theoretical/experimental) and all domains. Its closure has subsequently left a considerable gap in this respect. The EU-managed Framework Programme, ERA-Nets, the ERC, COST Actions, national programmes, and other funding instruments are not seen as able to fill this void.

Although quantifying the research outcomes cannot be precise, assuming that the sample of 12 programme examined by us in detail is representative of the EUROCORES scheme as a whole, this would mean that during the 2008-15 period EUROCORES supported the activities of over 2,500 researchers across Europe, leading to over 8,000 publications and other scientific outputs and a total of 564 networking events. From an efficiency perspective, assuming again that the 12 EUROCORES programmes for which

financial data is available and which are analysed in Section 4 are typical of the other 35 programmes that have been supported since 2003, this would mean that during the period 2009-15, expenditure under the EUROCORES scheme on research activities totalled EUR 263.2m with a further EUR 16m being provided by the ESF to support networking and dissemination activities. Overall, EUORCORES was both effective and efficient in generating cost-effective outcomes.

As was also the case with the earlier evaluation of the FP6-supported EUROCORES Scheme, this study has also found strong evidence of additionality (added value), i.e. without the support of the Scheme, most projects would not have been able to go ahead, at least on the same scale and with the same partners. As noted in Section 2, at the time when EUROCORES was launched, and for many years afterwards and arguably now, there were no real alternatives to EUROCORES with regard to funding 'bottom-up' cross-border collaborative research. Whilst the transnational dimension was clearly central to the Scheme and the outcomes it achieved, the inter-disciplinary aspect of EUROCORES, whilst not critical, was nevertheless also an important feature that made EUROCORES different to other programmes.

In addition to the achievements of EUROCORES in relation to science, the scheme pioneered methods of promoting cross-border collaborative research in Europe that are or are likely to be of benefit to other European (or international) funding instruments. By its very nature, the funding and management of international research projects involving partners from different countries is highly complex. It involves striking a balance between scientific considerations and the interests and priorities of European countries' funding agencies. EUROCORES developed a system that, despite its imperfections, succeeded in combining these interests and there are many lessons learnt that are of on-going relevance.

5.2.1 Lessons to be Learnt and Future options

There are a number of lessons to be learnt from the evaluation of EUROCORES that is relevant to future collaborative research activities in Europe. Any attempts to set up a new version of EUROCORES (or to modify an existing scheme to include its key characteristics) would benefit from the following lessons:

Lessons to be learnt from EUROCORES

- EUROCORES calls for themes and calls for proposals were developed and written by recognised researchers working in the various field(s) covered by the scheme. This attracted other good researchers who recognised the high level of scientific knowledge behind the call.
- The ESF provided highly competent science officers to support research teams and to encourage inter-disciplinarity and collaboration. This was another competitive advantage of the scheme and which appeared to attract high-quality researchers.
- EUROCORES provided flexible grant conditions and opportunities for research collaboration. This seemed to have been particularly helpful in aiding established researchers to foster the younger generation.
- Any future scheme must ensure that it has the long-term commitment required from participating funding agencies with respect to financial commitments as well as a common understanding of the role of bottom-up research. Judging by the EUROCORES experience, a 'common pot' approach (ideally involving an EU funding mechanism) is a prerequisite for a sustainable 'bottom up' scheme. This would eliminate the difficulties encountered in seeking

financial commitments on a programme-by-programme and country-by-country basis.

- The time between applications and grant decisions needs to be shorter – the EUROCORES grant application procedure was scientifically well regarded but slow. Because of delays at national level, it could take up to 18 months between the submission of a grant application and the start of a successful proposal. A 'common pot' type arrangement which is not dependent on Member Organisations' individual legal rules, administrative cycles and financial procedures would be more efficient. A 'virtual pot' arrangement may have merit and could help overcome some of the funding agency boundary/border issues.
- Relating to the last two points, any future scheme needs to solve the issue of a risk of funding lower ranked bids rather than high-ranking ones as a consequence of individual national funding agencies changing their minds about the desirability of supporting particular bids for reasons unconnected to their quality.

5.2.2 Future options

This evaluation supports the argument that the rationale for the EUROCORES Scheme is still relevant today. The contributions made by the ERC, ERA-Nets, the Marie Skłodowska-Curie actions and other initiatives to foster high quality collaborative research in Europe are also of course very important. However, as the recent Science Europe gap analysis on international collaboration opportunities for Life, Environmental and Geo Sciences researchers concluded, there is a lack of support to foster 'bottom-up' research (at least in these fields). We agree with this conclusion in relation to the wider areas of research that were covered by the EUROCORES scheme. In short, although EUROCORES has come to an end, there is a strong case for steps to be taken to ensure that a similar instrument is available in the future to promote researcher driven (bottom up) research in Europe. The question is how this can be best achieved.

Based on our evaluation, we identified a number of options for funding bottom up collaborative research, taking into account the good practices of EUROCORES and the lessons learned by the scheme and its beneficiaries. The various options were discussed at the two focus groups that were organised towards the end of the study.

We have examined three options:

- *Option 1* - Accepting the situation as it now stands post-EUROCORES;
- *Option 2* - Modifying an existing EU-funded instrument so that it includes the characteristics of a EUROCORES call;
- *Option 3* - Establishing a new scheme that would be funded by EU Member States.

Options 2 and 3 both involve replacing EUROCORES with a successor scheme that could continue to support bottom-up collaborative research in Europe. However, whereas under Option 2 this would be done within the framework of an existing (EU-funded) programme, Option 3 assumes that it would not be possible to adjust an existing programme and that funding for a new scheme would therefore almost certainly have to come from Member States (but ideally made available via a 'common pot'). In both the case of Option 2 and Option 3, the function of administering a new scheme could be contracted out.

5. Conclusions & Future Options

Option 1: Status quo

The first option is to rely on the portfolio of funding instruments that are currently available to support cross-border collaborative research in Europe. It could be argued that there is already a sufficient range of instruments to support collaborative research in Europe. This includes the Horizon 2020 programme and the ERA Net scheme, and smaller instruments such as COST. Researchers can also be supported through individual grants provided by the ERC. In addition, there are bi- and multi-lateral agreements at national level which promote international cooperation between countries. Equally, at an institutional level, universities and research organisations can work strategically across borders and disciplines without relying on structured programmes. However, only a fifth (20.6%) of our survey respondents suggested that they would have been able to achieve the same research outcomes under another pan-European funding programme, indicating that EUROCORES had important features that are distinct from alternative schemes.

Although ERA-Net does not cater for 'bottom-up' research, for several reasons (e.g. direct management of funds and calls for proposal content, perceived cost-effectiveness), according to our consultations, the scheme appears to be the favoured instrument of the funding agencies. The scheme is also well-funded. An assessment of the ERA-Net Scheme published by DG RTD last year suggested that the total public funding of research implemented by ERA-NETs and ERA-NET Plus since 2002 amounts to more than EUR 2.3 billion.[115]

Moreover, the Open Research Area social sciences collaboration between funding agencies in France, Germany, the Netherlands and the UK, is an illustration of how countries with larger and more advanced research capacity are increasingly proactive in developing more tailored 'bottom-up' instruments seemingly better fitted to their needs. Quoted in a recent (August 2015) Science Europe paper, the European Commission stated that it "*will launch a debate with Member States on the best possible level of coordination and alignment of national research strategies and pooling of funding in the domains of the societal challenges in order to increase impact at EU level. Possible outcomes could include defining a level of national funding to be spent within a coordinated European framework and measures to increase the number of countries committed to joint programming*."[116] This is yet another indication that the joint programming approach as developed within the European Commission managed instruments is further evolving.

However, notwithstanding the existence of other schemes, as the findings from our evaluation suggest, there would be drawbacks in simply relying on existing schemes with some of the key benefits derived from a 'bottom up' scheme such as EUROCORES being lost. Firstly, there would be a lack of new ideas/new approaches to tackling key research question and socio-economic challenges alike which are currently not within the remit of policy-led research priorities. Concentrating research funding into 'strategic' areas could create a narrow, risk-averse approach to research which inadvertently inhibits scientific curiosity, breakthrough and innovation – the very features public funding should encourage for market failure and other reasons. This is not to say that strategic priorities are not important. However, a reasonable balance needs to be struck.

Secondly, the current European funding instruments tend to focus either on outstanding individual researchers or on large consortia involved in near market research that has likely industrial application. Some might argue that this type of research could or should be part funded privately. There is no disputing the value and key role of research in contributing to economic growth, solving socio-economic challenges,

[115] European Commission DG RTD Niehoff (2014) The ERA-NET scheme from FP6 to Horizon 2020 Report on ERA-NETs, their calls and the experiences from the first calls under Horizon 2020

[116] Science Europe Position Statement On the Role and Future of Joint Programming August 2015

and providing an evidence-base for policy decisions. Yet, there is equally an argument to make in that funding agencies – in their public role of ensuring value for money – are too risk averse.[117],[118] EUROCORES filled a gap by promoting medium-sized projects and the role of younger researchers (PhD students, postdocs). This approach was beneficial as it gave younger scientists international exposure and experience in an emerging field of research. In the medium- and longer-term, without EUROCORES, Europe risks developing an insufficient number of well-trained early stage researchers – beyond those supported by the ERC and Marie Skłodowska-Curie actions – and thereby creating a structural weakness in the ERA. In particular, smaller countries' early stage researchers are at risk as a result of lack of opportunity.

Option 2: Modifying an existing funding instrument to promote bottom up research

The second option, assuming a gap in the availability of support for 'bottom-up' collaborative research is accepted, would be to modify an existing funding instrument so that it includes the characteristics of a EUROCORES call. One possibility would be to explore the scope to take advantage of the Excellent Science Pillar in the current Horizon 2020 programme, and/or to incorporate the possibility of EUROCORES-like funding in the developments of 'Framework Programme 9' which due to commence in 2021. This would mean using current administrative structures and the EU's research and innovation budget.

A second approach could be to encourage the Member States to organise EUROCORES-type calls under the Joint Programming Structure using the ERA-Net Scheme. However, according to our consultations this could be more problematic than making use of the Excellent Science Pillar. As reported by DG RTD in 2014, the "focus [of ERA-Net] is shifting from the funding of networks to the top-up funding of individual joint calls in selected sub-challenges with high European added value and relevance for Horizon 2020 (policy-driven approach)".[119] Indeed, we understand that there is currently no scope or commitment to fund bottom-up research through the ERA-Nets.

A third possibility would be to make use of the European Research Council to help develop a new EUROCORES-like scheme. The ERC has already piloted the Synergy Grant scheme[120] which bore many of the characteristics of EUROCORES. The two pilot calls proved to be oversubscribed with around 700 applications for 11 grants in 2012 and 400 applications for 13 projects in 2013[121] The results of the pilot have now been analyzed and based on this the Scientific Council of the ERC will decide on any future calls. It is unknown

[117] See for example the case of the 2004 US Council on Competitiveness report which also underlined that the US, through the National Institutes of Health has begun to seed more innovative, high-risk research. This report suggested that "*federal research support since the Cold War has become more conservative, focusing on short-term, incremental, low-risk goals. Outside the government, the council believes that risk-based investments are also needed to promote innovation. Investors tend to focus on short-term profits and are unwilling to accept the risks that come with investing in a long-term research project*". Quoted in Committee on Prospering in the Global Economy of the 21st Century: An Agenda for American Science and Technology; Committee on Science, Engineering, and Public Policy; Institute of Medicine; Policy and Global Affairs; National Academy of Sciences; National Academy of Engineering (2007) Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future. National Academies Press. See chapter: Investing in High-Risk and Breakthrough Research.

[118] Another example of this debate was published in Research Europe by Francesco Sylos Labini "*The ERC must take risks to make the most of Europe's scientists. See* Research Europe 11 September 2014. Available at http://www.researchresearch.com/index.php?option=com_news&template=rr_2col&view=article&articleId=1346425

[119] European Commission DG RTD Niehoff (2014) The ERA-NET scheme from FP6 to Horizon 2020 Report on ERA-NETs, their calls and the experiences from the first calls under Horizon 2020

[120] http://erc.europa.eu/synergy-grants

[121] Interview with ERC

whether there is sufficient funding available to the ERC to expand its portfolio to support collaborative research in the way EUROCORES did.

The recently established Science Europe is exclusively focused on policy co-ordination and not science programme management. Hence, managing or operating a new EUROCORES endeavour is outside its remit.

Our conclusion is that judging by the current set-up of research funding in Europe, none of the existing funding instruments, would be ideal to host a new EUROCORES scheme as no instrument operating today could easily be adjusted to incorporate the key objectives of EUROCORES. In addition, this evaluation has also concluded that if any new EUROCORES scheme were to be established, modifications to the framework would be needed to include a 'common pot', virtual or real. Advocates of a EUROCORES successor would need to make a sustained effort to convince those operating existing instruments to introduce modifications of the kind outline above, and this could be difficult to achieve.

Option 3: Establishing a new funding instrument

The third option would involve the establishment of a new European funding instrument with the key characteristics of EUROCORES which would be independent of any existing instrument and managed by a dedicated body at European level. To a certain extent, this option would seek to replicate the success of the ERC since its establishment in 2007 as an example of what can be achieved when there is political backing and financial resources to promote excellent research in Europe. As noted earlier, the assumption underpinning Option 3 is that it would not be possible to adjust an existing (EU-funded) programme and that funding for a new scheme would therefore almost certainly have to come from Member States (but ideally made available via a 'common pot').

Under Option 3, one approach to setting up a new instrument would be through an open call for tenders issued by the European Commission, the ERC, or another suitable European entity. The selected entity would become the managing agent for a new scheme. Another approach would be to use the variable geometry mechanism outside of its current framework, for example, a revised version of the 'virtual common pot' developed by European countries and the European Commission under the ERA-Net scheme. This kind of technical support role could be also generated through a competitive tendering process. A further possibility is that some or all of the EU Member States agree to fund a new EUROCORES-like scheme outside the framework of an EU-supported instrument but with a 'common pot' as a key feature.

The precise particulars of a new instrument would need to take into account the lessons learned from EUROCORES as well as the forthcoming evaluation of the ERC's Synergy Grants. This approach of creating a new funding instrument along the lines outlined above would be the preference of the research community (according to our consultations) but would also broadly complement the strategic approach of the Joint Programming method. The ERA-Nets and the industrially-focused JPIs have played a key role for the national funding agencies and their efforts to coordinate research agendas across the EU. However, an independent, scientifically-focused body in charge of such an instrument would be better placed to avoid the potential pitfalls of the second option outlined earlier.

Whilst the third option has advantages in leading to a scheme that would most closely replicate the best features of EUROCORES, it is questionable whether there is sufficient policy backing to do this. Outside a centrally-funded EU-level structure, it would be up to the (soon to be) former Member Organisations of the ESF to revisit the question of reopening a EUROCORES-like scheme and to decide on the most appropriate managing agent. This evaluation's findings indicate that most of them seem to be resigned to the fact that EUROCORES is now permanently closed. Overall, therefore, whilst Option 3 would be the ideal, given the

5. Conclusions & Future Options

likely lukewarm backing for this approach, Option 2 should be treated as a fall-back course of action that may have a better chance of succeeding.

In any new scheme, whether under Option 2 or Option 3, the ESF would be in a strong position to be the managing agent. The ESF possesses the experience and know-how of managing EUROCORES and managing scientific schemes is one of the core service areas for the successor organisation. The ESF could provide a good quality support structure in a cost-effective manner that could be linked to a funding mechanism. It may be, however, that political sensitivities outweigh other considerations and preclude consideration of ESF as a managing agent.

A. List of interviews

	Name	Role in EUROCORES	Affiliation	Country
1	Alexandre Quintanilha	PL, IP or AP	Institute for Molecular and Cell Biology	PT
2	Ana Helman	ESF EUROCORES staff	ESF	n/a
3	Berry Bonenkamp	EUROCORES Committee member	NWO	NL
4	Catarina Resende	EUROCORES Committee member	FCT	PT
5	Dick E.H de Boer	PL, IP or AP	University of Groningen	NL
6	Flocel Sabaté	EUROCORES Committee member	Universitat de Lleida	ES
7	Elod Nemerkenyi *	EUROCORES Committee member	Central European University	HU
8	Astrid Lunke	ESF EUROCORES staff	Former ESF	n/a
9	Sarah Moore	ESF EUROCORES staff	Former ESF	n/a
10	Paola Campus	ESF EUROCORES staff	ESF	n/a
11	Maria Manuela Nogueira	ESF EUROCORES staff	ESF	n/a
12	Eva Hoogland	ESF EUROCORES staff	Former ESF	n/a
13	John Marks	ESF EUROCORES staff	Former ESF	n/a
14	Marc Heppener	ESF EUROCORES staff	ESA (former ESF)	n/a
15	Nico Kos	Member Organisations (Funding agencies)	NWO	NL
16	Ronald Noë	PL, IP or AP	Institut Pluridisciplinaire Hubert CURIEN	FR
17	Friedrich Thielemann	PL, IP or AP	University of Basel	CH
18	Graham Tebb	Member Organisations (Funding agencies)	University of Veterinary Medicine, Vienna	AT
19	Jean-Pierre Henriet*	PL, IP or AP	Ghent University	BE
20	Hanns-Christoph Nägerl	PL, IP or AP	Universität Innsbruck	AT
21	Falk Reckling	Member Organisations (Funding agencies)	Austrian Science Fund	AT
22	Farzam Ranjbaran	ESF EUROCORES staff	Former ESF	n/a
23	Svenje Mehlert	ESF EUROCORES staff	Former ESF	n/a
24	Benno Hinnekint*	Member Organisations (Funding agencies)	Honorary director Research Foundation Flanders	BE
25	Karsten Horn	PL, IP or AP	FHI Berlin	DE
26	Vincenzo Palermo	PL, IP or AP	National Research Council	IT
27	Gerald Albert	PL, IP or AP	University of Amsterdam	NL
28	Jan Kratochvil	PL, IP or AP	Charles University	CZ
29	Enrique Ortega	PL, IP or AP	Universidad del Pais Vasco	ES
30	Tim Freegarde	PL, IP or AP	University of Southampton	UK
31	Itziar Laka	PL, IP or AP	University of the Basque Country UPV/EHU	ES

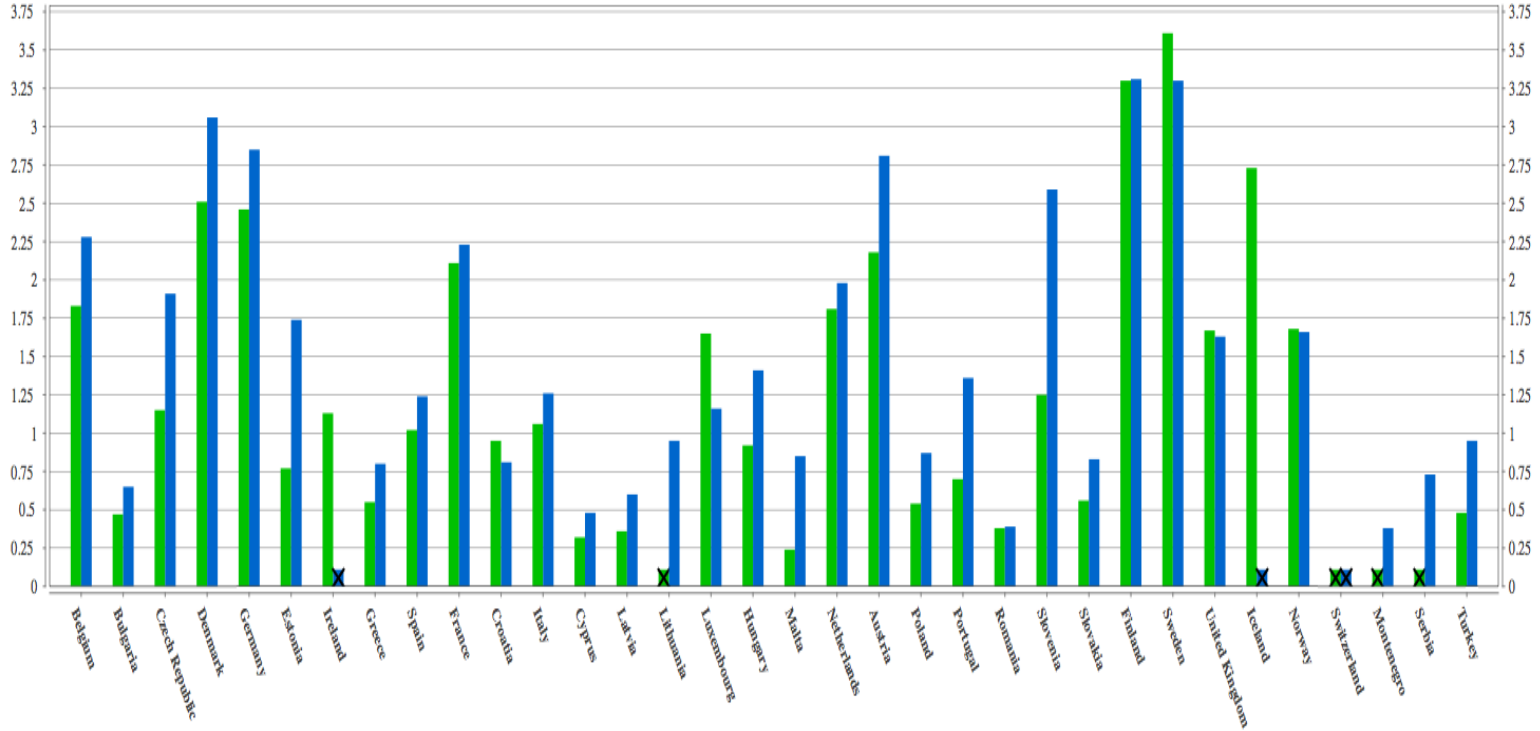
A. List of interviews

	Name	Role in EUROCORES	Affiliation	Country
32	Francesco d'Errico	PL, IP or AP	Université Bordeaux	FR
33	Dr. Sylvie Gaudron	PL, IP or AP	Sorbonne Universites	FR
34	Dr. Joanna Kargul	PL, IP or AP	University of Warsaw	PL
35	Prof. De Groot	PL, IP or AP	St Andrew's University	UK
36	Prof. Gogdell	PL, IP or AP	University of Glasgow	UK
37	Dr. Beatrice Lawal*	Member Organisations (Funding agencies)	FWF	AT
38	Aart C. Liefboer	PL, IP or AP	VU University Amsterdam	NL
39	Ulrich Teichler	PL, IP or AP	Universität Kassel	DE
40	Stefan Koch	Member Organisations (Funding agencies)	Deutsche Forschungsgemeinschaft	DE
41	Christine Musselin	PL, IP or AP	Centre de sociologie des organisations	FR
42	Anna d'Amato	Member Organisations (Funding agencies)	CNR	IT
43	Stefan Bielack	PL, IP or AP	Klinikum Stuttgart	DE
44	Sigbjørn Smeland	PL, IP or AP	University of Oslo	NO
45	Jeremy Whelan	PL, IP or AP	University College London	UK
46	Holger Lerche	PL, IP or AP	University of Tubingen	DE
47	Peter De Jonghe	PL, IP or AP	University of Antwerp	BE
48	Asla Pitkänen	PL, IP or AP	University of Eastern Finland	FI
49	Rudi Balling	PL, IP or AP	University of Luxembourg	LX
50	Ingo Helbig	PL, IP or AP	University Hospital Schleswig-Holstein	DE
51	Christos Angelopoulos	N/a	European Commission DG RTD	N/a
52	Benjamin Turner	N/a	European Research Council	N/a
53	Jörg Niehoff	N/a	European Commission DG RTD	N/a
54	Sébastien Huber*	N/a	Science Europe	N/a
55	Reinhard Belocky*	Member Organisations (Funding agencies)	Science Europe/FWF	AT
56	Torsten Fischer	Member Organisations (Funding agencies)	Deutsche Forschungsgemeinschaft	DE
57	Imrich Barak*	PL, IP or AP	Slovak Academy of Sciences	SK
58	Iveta Hermanovska*	Member Organisations (Funding agencies)	Slovak Centre of Scientific and Technical Information	SK
59	Marianna Kovakova*	PL, IP or AP	University of Comenius	SK
60	Sona Ftacnikova*	Member Organisations (Funding agencies)	Slovak Research and Development Agency	SK

* Attended workshop

B. Supporting tables

Gross domestic expenditure on R&D (GERD) as percentage of GDP 2003 (Green) and 2013 (Blue)



Source: Eurostat

B. Supporting tables

Total GBAORD as a percentage of total general government expenditure

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Belgium	1.19	1.13	1.25	1.23	1.34	1.23	1.24	1.18	1.17	1.17
Bulgaria	0.84	0.78	0.82	0.65	0.79	0.81	0.73	0.69	0.7	0.65
Czech Republic	1.1	1.21	1.28	1.34	1.27	1.34	1.33	1.51	1.47	1.56
Denmark	1.31	1.36	1.41	1.56	1.63	1.68	1.66	1.76	1.71	1.82
Germany	1.61	1.63	1.65	1.74	1.77	1.86	1.89	1.97	1.98	2.04
Estonia	:	:	:	:	:	:	1.73	2.02	2.08	2.11
Ireland	1.19	1.28	1.23	1.27	1.19	1.12	0.76	1.01	1.04	1.03
Greece	:	:	0.7	0.61	0.84	0.66	0.58	0.58	0.7	0.79
Spain	1.35	1.39	1.75	1.9	1.83	1.76	1.68	1.48	1.24	1.22
France	1.77	1.78	1.5	1.39	1.6	1.59	1.45	1.46	1.28	1.24
Croatia	:	:	:	:	1.47	1.47	1.54	1.55	1.54	1.31
Italy	:	1.36	1.23	1.32	1.27	1.22	1.19	1.14	1.08	1.03
Cyprus	0.73	0.74	0.76	1.02	0.99	1.07	1	0.97	0.86	0.8
Latvia	0.5	0.54	0.69	0.82	0.74	0.46	0.36	0.38	0.4	0.39
Lithuania	1.07	1.03	0.94	1.42	1.22	1.15	1	0.95	0.99	1.01
Luxembourg	0.58	0.61	0.78	1	1.14	1.22	1.3	1.41	1.48	1.56
Hungary	:	0.82	0.7	0.77	0.87	0.9	0.72	0.59	0.7	1.33
Malta	0.4	0.42	0.36	0.34	0.35	0.37	0.54	0.52	0.66	0.69
Netherlands	1.76	1.76	1.74	1.71	1.65	1.63	1.6	1.65	1.54	1.59
Austria	1.19	1.26	1.27	1.28	1.37	1.39	1.46	1.55	1.52	1.58
Poland	:	:	:	:	:	:	0.8	0.71	0.83	0.86
Portugal	1.3	1.46	1.48	1.63	1.94	1.99	1.9	1.99	1.89	1.84
Romania	0.51	0.65	0.93	0.96	1	0.74	0.7	0.68	0.59	0.59
Slovenia	1.28	1.27	1.24	1.22	1.14	1.4	1.22	1.19	1.1	0.81
Slovakia	0.78	0.7	0.69	0.57	0.75	0.82	0.9	1.14	1.02	0.96
Finland	1.96	1.99	2.03	1.99	1.94	1.95	2.02	1.94	1.84	1.73

B. Supporting tables

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Sweden	1.56	1.55	1.56	1.51	1.5	1.62	1.61	1.54	1.61	1.57
United Kingdom	1.59	1.51	1.49	1.47	1.31	1.28	1.23	1.2	1.17	1.23
Iceland	2.01	2.08	2.08	2.02	1.6	2.14	2	2.15	2.22	2.41
Norway	1.66	1.69	1.8	1.87	1.82	1.87	1.9	1.86	1.84	1.82
Switzerland	1.98	:	2.02	:	2.23	:	2.33	:	2.63	:

Source: Eurostat

B. Supporting tables

Overview of recent collaborative funding instruments at European level

Funding programme		Managed by	Focus	Budget
Meta instruments[122]	ERA-NETs – EU instrument for coordinating and structuring the European Research Area	EU Member States	The objective of the ERA-NET scheme is to develop and strengthen the coordination of national and regional research programmes through two specific actions: • 'ERA-NET actions' - providing a framework for actors implementing public research programmes to coordinate their activities e.g. by developing joint activities or by mutually supporting joint calls for trans-national proposals. • 'ERA-NET Plus actions'- providing, in a limited number of cases with high European added value, additional EU financial support to facilitate joint calls for proposals between national and/or regional programmes. National and regional authorities identify research programmes they wish to coordinate or open up mutually.	Varies.
	Joint Programming	EU Member States and the European Commission	The overall aim of the Joint Programming process is to pool national research efforts to tackle common European challenges in a few key areas. It is led by the Member States who agree, on a voluntary basis and in a partnership approach, on common visions and Strategic Research Agendas to address societal challenges. On a variable geometry basis, Member States commit to Joint Programming Initiatives where they implement together joint Strategic Research Agendas. Joint Programming areas are identified by a High Level Group on Joint Programming consisting of nominees from Member States and the Commission, following a consultation of stakeholders. Based on the result, the Council, upon a proposal by the Commission, recommends a limited number of areas in which to implement Joint Programming in priority. From there on, participation of Member States in each initiative is based on voluntary commitments leading to partnerships composed of variable groups of countries.	Varies. The JPI Agriculture, Food Security and Climate has a total budget of approximately EUR6 million.
Horizon 2020		European Commission	Horizon 2020's calls for proposals are organised into multiannual "Work Programmes", in the following categories • Excellent Science (European Research Council, Future and Emerging Technologies, Marie-	EUR80bn (2014-2020)

[122] Meta instruments are instruments that coordinate research and innovation investments transnationally. Their target group is research funders as opposed to research-performing organisations and typically include a portfolio of research-funding instruments.

B. Supporting tables

Funding programme	Managed by	Focus	Budget
		Sklodowska-Curie Actions, Research Infrastructures) • Industrial Leadership (Leadership in enabling and industrial technologies, Information and Communication Technologies, Nanotechnologies, Advanced materials, Biotechnology, Advanced manufacturing and processing, Space, Access to risk finance, Innovation in SMEs) • Societal Challenges (Health, demographic change and wellbeing, Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bio economy, Secure, clean and efficient energy, Smart, green and integrated transport, Climate action, environment, resource efficiency and raw materials, Europe in a changing world - inclusive, innovative and reflective societies, Secure societies - protecting freedom and security of Europe and its citizens, Spreading excellence and widening participation) • Science with and for Society • Euratom Research and Training Programme 2014-2018	
European Research Council (ERC) grant scheme	European Research Council	ERC funding schemes are open to top researchers of any nationality or age who wish to carry out their frontier research in the EU or associated countries. The ERC was set up in 2007 under FP7. It aims to enhance the dynamic character, creativity and excellence of European research at the frontiers of knowledge. The ERC is part of the 'Excellent Science' of Horizon 2020.	EUR13.1bn 2014-2020
COST[123]	COST Network National Member Organisations	COST funds pan-European, bottom-up networks of researchers across all fields. COST networks, known as 'COST Actions', promote international coordination of nationally-funded research. COST does not fund research per se, but provides support for networking activities carried out within COST Actions. COST Actions have a four-year duration and a minimum participation of five COST Countries. A COST Action is launched when at least five COST Countries have agreed the MoU.	Budget depends on the number of countries participating
Open Research Area (ORA)	French National Research Agency, the German Research Foundation, the Economic and Social Research Council of	This funding scheme was introduced to support international collaborations in the social sciences. It offers funding for integrated projects by researchers coming from at least two of the four countries (FR, DE, NL, UK). Other international funding organisations may be invited to join the scheme.	Unknown

[123] The COST Association was established in September 2013 by the COST Member Countries as an international not-for-profit association under Belgian law. The COST Association integrates governance, management and implementation functions into a single structure, thus ensuring the intergovernmental nature of COST and its pan-European dimension. The 36 COST Member Countries are full members of the COST Association; Israel is a Cooperating State.

B. Supporting tables

Funding programme	Managed by	Focus	Budget
	the UK, and the Netherlands Organisation for Scientific Research		
NordForsk	Nordic Council of Ministers	NordForsk launches and coordinates research programmes in fields where the Nordic countries see there is added value in cooperation. The first step is to identify an important topic that is suitable for research activities at the Nordic level, and which NordForsk can help to coordinate. Topics may have their origin in politically-based discussions and decisions, or in input from a wide array of actors in the research sector and society at large on areas where more knowledge is needed.	EUR16 m per year
Future and Emerging Technologies (FET) Open Programme	European Commission	FET Open supports early-stage research on any idea for a new technology. There are no pre-defined themes. It encourages scientists and engineers from multiple disciplines to work together on science- and technology research.	EUR1.2bn 2014-2020

Source: Programme websites

C. Focus Group Summaries

This appendix contains summarises of the focus groups that were held in Bratislava and Brussels.

Focus Group 1, Bratislava 23 September 2015

Participants

Dr. Marianna Kovakova, Comenius University in Bratislava
Dr. Sonia Ftacnikova, Slovak Research and Development Agency
Dr. Iveta Hermanovska, Slovak Centre of Scientific and Technical Information
Dr. Imrich Barak, Slovak Academy of Sciences
Dr. Elod Nemerkenyi , Hungarian Scientific Research Fund
Dr. Beatrice Lawal, Austrian Science Fund

Activities and organisation around EUROCORES

For Hungary, EUROCORES was of interest to national researchers and OTKA was approached by potential EUROCORES applicants. The interest from the national research community helped to justify spending in EUROCORES. Support for the EUROCORES scheme also become a way for OTKA to avoid national competition between researchers.

OTKA has an online proposal system and asked for proposals in English to facilitate international collaboration. The Fund was to appeal to develop international collaboration despite risk to be unfair to different sciences. The ESF was also good at selling the scheme. One of the lasting policy impacts has been to learn from ESF's policy thinking.

The Slovak research and innovation funding agencies were set up after 2001 (early/mid 2000s). The Slovak R&D Agency was created to support researchers – although it was not systematic at the time – including international cooperation. The first organisation participating in funding EUROCORES in Slovakia was the Academy.

The agency wasn't able to involve international collaboration in national funding, so EUROCORES provided a good solution to this issue. The agency supported 6 individual projects. It was good to see international peer review, as Slovakia is a small country. Successful proposals from Slovak researchers were a clear sign of high quality research. EUROCORES also provided a good platform for learning how to do peer review at European level and to learn about supporting bottom up research.

Universities in Slovak complained as only the academy scientists could join. Academy could save the money and the agency would fund. This change had a big change internally.

From the Slovak Academy, it was a strategic decision to join EUROCORES. It started with the ESF's research networking programme. The research community also felt the need to join [EUROCORES]. Over time, the universities in Slovakia complained they were not able to participate in EUROCORES. Hence the step was taken to have the Agency fund EUROCORES instead. This was a big change.

For participating researchers, EUROCORES was a good opportunity to make contact with international colleagues. Marianna Kovakova was involved in one of the geological EUROCORES projects (TOPO-EUROPE/VAMP). During the project, she developed and kept contacts. The initial project also led to new collaborations. Today MK is involved in a Marie Curie action/project.

Other participants also build on EUROCORES. MK knew some of the EUROCORES participants but on a personal level and there hadn't been other opportunities to work together on a funded project. There were only individual grants or the Framework Programme as possible alternatives.

Imrich Barak (SAVBA) was part of EUROSCOPE – collaboration with fellow researchers began during the project and still continues today. From his perspective, it is sad that the programme is over.

From a national perspective, it would be good to have a programme [like EUROCORES] to complement infrastructure funding.

To the FWF in Austria, it has always been a core business to work with the ESF. The Fund established an international office 10 years ago but also participated in international programmes before that.

The FWF budget was EUR211 m last year and out of this 13% funded international collaboration. For EUROCORES, FWF funded between 2003-2013 87 individual projects or 2.2 projects per EUROCORES call. FWF spent approx. EUR 26 million spent on EUROCORES over 10 years. The scheme had a high importance from FWF's board's perspective. The fund nominated scientists to get them on board the outline proposals work (EUROCORES theme proposals). Criteria for FWF to fund EUROCORES projects were the relevance of research, and other national participants.

However, towards the end of the EUROCORES scheme there was little interest [generally] to participate mainly because the level of commitments of other countries was too low.

Management of EUROCORES & organisation

It wasn't possible for EUROCORES to implement a common pot mechanism. A common pot means a lottery for the funding agencies financing the programme.

All funding agencies had stand-alone projects for international collaboration. It wasn't only EUROCORES that funded high quality international projects. But one added value of the EUROCORES scheme was the multi-projects. The CPR-level networking was great.

There were other administrative issues that needed to be solved. For example a funding agency can't support 'foreign' researchers. Nor can all funding agencies spend money outside of calendar year.

The funding agencies of EUROCORES were part of the organisation. They nominated scientists to participate (peer review?) Researchers developed ideas to submit as outline proposals. As an end user, MK was very happy with the communication between the agency, university and ESF. The monitoring requirements were lighter than the EC programmes too.

FWF think that the ESF did a great job with EUROCORES and worked continuously to improve the scheme. After the review of 2007 ESF tried to improve the application process, which went from 14 to 10 month selection. The peer review was excellent, and ESF published useful publications, such as a peer review guide, templates, on how to select a good project. ESF was a good forum for discussion.

C. Focus Group Summaries

The challenges started after the FP6 funded period ended, and this also coincided with the economic crisis.

FWF requested a final report from each completed project – there is no difference between international and national projects. The Fund collects data on performance and use for database and evaluate. An evaluation of international projects will most likely be conducted in 2017.

It was costly to support EUROCORES. In addition to the research contribution, the funding agencies had to contribute with EUR 9,100 per PI per year. As a result, funding agencies either joined a EUROCORES programme with high commitment or stayed out.

If a funding agency withdrew commitment, a EUROCORES programme become like a house of cards. This was the main issue from the researchers' point of view – a drop out of countries impacted negatively on the projects. It was good that EUROCORES proposals were evaluated from European level.

From the researchers' perspective, the annual report required was not a burden as such (this was a national – Slovak – requirement) and international reporting (ESF – mid-term and final reporting) was reasonable too. The scientific reporting was very similar so researchers could reuse.

Performance and Results, Added value from a scientific perspective

The umbrella approach of EUROCORES worked really well. The internationalisation aspect was also beneficial. However, it should also be taken into account that EUROCORES applications were also opportunistic – researchers submit proposals where funding is available.

Yes, EUROCOORES was a good opportunity for young researchers. It also especially benefitted fields of research which had no border (geology). MK had the opportunity to work in Turkey with young researchers; they are now also participating in the Marie Curie action. Even undergraduate researchers could benefit from EUROCORES. But there are many programmes that involve young researchers.

EUROCORES' bottom-up research agenda was also beneficial for younger researchers.

The interdisciplinarity aspect was new, but only at an international level.

The ESF's programmes were better than EU equivalent. There was an active involvement in the peer review process. The real problem was the funding. At one stage, the ESF presented a solution like the ERC but that meant no involvement of Member Organisations. With the changed role of the ESF, we are now back to relying on bilateral agreements. We have gone full circle.

Concluding points

- How to take the good side of EUROCORES and solve the budget problem. One approach would be to use the budget from H2020 to call for proposals. And use EC budget. ESF less bureaucratic than EC (which was an advantage).
- How would a new EUROCORES scheme work with the existing ERA-Nets? There needs to be a strong commitment from the countries. The ERA-Nets are a mix of applied and basic research so the EC could split ERA-Nets into basic or applied. Big countries need to be involved.

C. Focus Group Summaries

- Why were the big countries not interested EUROCORES (towards the end)? The Grunwald report showed that Germany was positive but other countries not interested. In the end there was a lack of commitment. For example, the FWF is currently facing budgets cuts and struggling with bilateral programme and participation in ERA-nets. The agency wills need to be more restrictive in the future. There is competition between national and international funding within FWF. In Slovakia the support is mainly international mobility but they want to support international research. Co-financing of FP7/H2020 tale up 80 per cent of international funding. Slovakia cannot support more than 2, 3, 4 EUROCORES project. Out of EUR 25m only EUR1m goes on international cooperation.

Focus Group 2, Brussels
Wednesday, 1 October 2015

Participants:

Jean Pierre Henriet	Ghent University (BE)
Benny Hinnekint	Vlaanderen FWO (BE)
Sébastien Huber	Science Europe (BE)
Reinhard Belocky	FWF (AT)
Malin Carlberg	CSES
Jack Malan	CSES
Elena Guidorzi	CSES

The focus group discussion was opened with a presentation by the study project manager (MC), including some of the Interim Evaluation Report's results. The following pages provide a summary of the main discussion.

What was the rationale of EUROCORES when it was set up? What needs was the programme trying to meet?

Each participant explained their experience of the EUROCORES programme. Specifically they provided examples of the strategic meaning that EUROCORES had in relation to international collaboration strategies and agendas.

The FP6 call to set up EUROCORES was discussed. The EUROCORES Scheme was a result of a network of smaller research collaborative initiatives supported under previous FPs. Overall, participants agreed that what ESF offered through the EUROCORES programme was significant and relevant because it aimed to provide support for international collaborative research which was bottom-up and complementarity to the top-down approach of FP. For example, EUROCORES was the first transnational collaborative instrument to be rolled out in Austria/FWF. At the time, for FWF it was important to give scientists the opportunity to work in transnational working team. FWF participated in 78 projects. FWF is committing to undertake an internal evaluation of the projects they funded.

C. Focus Group Summaries

From a researcher's perspective, EUROCORES provided a number of advantages. In the domain of ocean and polar science EUROCORES helped establish a European/international research community and helped support several new lines of enquiry. In addition to the EUROCORES research grants, each EUROCORES Programme comprised a significant budget for networking and dissemination. This was a key added value of the Scheme.

EUROCORES was particularly important for small to medium-sized countries. EUROCORES was also particularly useful for universities and research organisations.

ESF and EUROCORES

In summary participants believed that even though Member Organisations agreed and committed to the bottom-up approach, the practicalities of it, especially in regard of budget management, were quite complex and raised particular challenges. A weakness of the scheme – and a consequence of the budget mechanism – is that the scheme wasn't fully bottom up. I.e. the MOs had a veto in terms of allocating the funding they had initially indicated at the start of the theme selection.

Views differed in terms of how transparent the ESF was in the EUROCORES selection and management process. The MOs had the opportunity to sit on the EUROCORES committees, however could not influence the peer review process (e.g. obtain names of reviewers), which was led by the ESF (this is also the procedure of other funders, including the ERC). Participants discussed the influence of big country MOs versus small and medium country MOs, and how national influence impacted on EUROCORES.

Another difficulty was to find ways of adapting the budget in a successful way. Participants generally agreed that in theory a 'common pot' method to manage funding is an attractive idea, however, it was not practically possible to agree a common approach. This was the major challenge and national funding agencies inability to commit often caused delays in the selection and start of projects. The budget problem stemmed from a lack of a common strategy. The ESF could not solve this.

Participants recognised the difficult position in which ESF was, and that some management requirement were quite challenging given the way the programme was set up.

At the time when the MOs was to vote on whether to discontinue the ESF in 2011, the official strategic position was that EUROCORES was going to continue. However in practise this did not happen. Commitment among some MOs wavered.

The future

Participants were invited to reflect on future needs for collaborative international research programmes and to discuss the extent to which existing and past initiatives are providing the right support/infrastructure to respond to researcher needs.

One observation was that international cooperation does not depend on instruments. Indeed cooperation happens anyway.

The future offer of instruments ought to learn from previous experiences and take into account lessons learned during the EUROCORES years. There was a general agreement that EUROCORES offered something that is no longer available in the European portfolio of instruments, and that

existing initiatives such as ERA-nets and JPI are not as satisfactory in terms of resources made available and for being truly science driven.

Participants thought that the EUROCORES scheme was an efficient way of accessing research resources. Indeed, research councils, which hold the majority of research resources, could effectively go through application processes.

By contrast, existing instruments such as ERA-nets and JPIs could not replace EUROCORES, neither from a financial nor a research strategy perspective. The resources made available via JPIs are not as large (and aimed at industrial involvement and/or application) ERA-net schemes are too top-down in their approach and tend to be used more by the countries with relatively large research capacity.

If a new scheme, similar to EUROCORES is to be set up, it is important to set out clear objectives and outcomes to be achieved. Careful consideration needs to be taken before setting up/piloting a new initiative. One solution would be to set up a 'parallel ERC', which would focus on collaborative research rather than individual grants.

The EC is now working on the development of FP9. Therefore, it is the right time to propose and provide recommendations. In addition Science Europe is currently undertaking an analysis of previous instruments and identify good practices to be considered for the future.

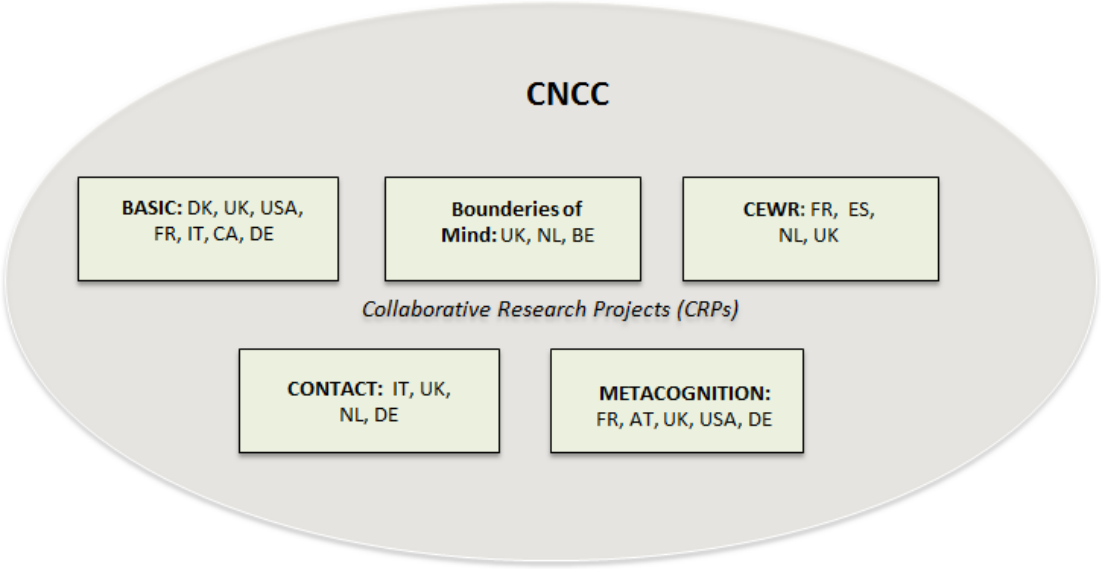
More generally, it was felt that there is a need to evaluate and revise existing platforms of collaborative research initiatives in Europe. This includes research, academia and incubation programmes (encouraging entrepreneurship among young researchers), bearing in mind that the policy context plays a big role and that should not be underestimated. What is important in doing this, is to maintain a continuity between programmes, otherwise there is a big risk of losing know-how and valuable experience.

As a conclusion, everyone seemed to agree that there is a need for a review of how international collaborative research is currently managed and implemented at EU level. The EU should start observing and learning from US experience and approaches.

D. Case Studies

Case Study 1: Consciousness in a Natural and Cultural Context (CNCC)

Figure 1: CNCC



1.1 Overview/Executive Summary

Consciousness in a Natural and Cultural Context (CNCC) was one of the earlier EUROCORES programmes. It was launched in November 2006 and ran until 2009. The programme was based on the belief that the study of consciousness constitutes an urgent scientific challenge, and that real progress in this area of research requires a collaborative effort that draws on all the available resources and manages to integrate a variety of theoretical and empirical disciplines and methods. The main objective behind the programme was therefore to provide an international, interdisciplinary platform for researchers from the humanities, social and natural sciences to build joint research projects on the nature, origins, and dynamics of consciousness.

The programme involved 33 research teams from 11 countries (AT, BE, DE, DK, ES, FR, IT, NL, UK, USA and CA) and probably constituted one of the largest collections of consciousness studies that has ever been carried out. The teams worked inside five Collaborative Research Projects (CRPs) examining different aspects of the selected study areas.

What stood out was the interaction and synergies created between the natural and social sciences and the way in which philosophical and empirical investigations were integrated. Methodologies typically associated with one field of research were combined with those from another field creating new interesting results, for example combining theoretical approaches, such as generating models and hypothesis with biological measurements, such as neuro-imaging. This approach turned out to be extremely fruitful for the results of the programme, and in the opinion of the Review Panel, it was this unique way of collaborating that made the CNCC notably different from other large-scale research programmes they had come across.

D. Case Studies

1.2 Background

The study and explanation of consciousness is considered by many to be one of the most important challenges for modern science and it was recently ranked by a major science magazine as the second biggest question facing science in the next 25 years. The underlying rationale for the EUROCORES CNCC programme was the principle that the study of consciousness is not simply a philosophical question, as has historically been the case, but a cross-disciplinary enterprise that needs to be taken up by researchers from the humanities, social and natural sciences working together in order to be fully explored and understood.

During the past decades scientific interest in consciousness has much expanded, partially due to technological developments, such as brain imaging techniques, and other conceptual changes. There have been remarkable results in biomedicine and neurosciences but there were signs that researchers had encountered a conceptual deadlock in the study of consciousness. Similarly, researchers in the humanities and social sciences (philosophy, history, sociology, anthropology, religious studies, etc.) and in psychology had made significant contributions to the understanding of the development of consciousness over time – yet they were struggling with the same fundamental problem: for just as natural sciences treat consciousness as a natural phenomenon, humanities tend to treat it as purely cultural.

The intention of the CNCC Programme was therefore to draw on a broad range of scientific resources in order to integrate a variety of theoretical and empirical disciplines and methods. The scientific content should be problem-driven rather than discipline-driven and should concentrate on questions and topics that were unlikely to be answered if pursued in a traditional mono-disciplinary manner.

Eight key areas within the field of consciousness were selected for further study: conceptual and methodological challenges, the metaphysics and phenomenology of consciousness, the sense of self, consciousness and emotion, norms and abnormalities in the study of consciousness, the phylogenetic and ontogenetic development of consciousness, consciousness and language, and consciousness in history and anthropology.

The main objective behind the programme was to provide an international, interdisciplinary platform for researchers from the humanities, social and natural sciences to build joint research projects on the nature, origins, and dynamics of consciousness.

1.2.1 Overview of Selection Process

Following an agreement with 22 funding agencies from Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Hungary, Italy, Luxembourg, the Netherlands, Portugal, Slovakia, Spain, Sweden, Switzerland, the United Kingdom, and the United States, the ESF launched a Call for Outline Proposals in the Spring of 2005 for CRPs to be undertaken under the EUROCORES CNCC Programme. The projects should run for 3-4 years in the period 2006-2009 and should combine national research funding and ESF support for networking and dissemination activities, bringing together a research budget over EUR 5 million (EC FP6 Contract no. ERAS-CT-2003-980409).

Participants have been very positive about the selection process in general. In the survey for this study, seven of the 11 CNCC respondents found that the selection via peer review was 'excellent' and created a fair and impartial process. There were some isolated negative comments about the length of time involved in the decision-making process, but most thought it had been 'good'. The same was the case for the time taken to receive the funding agreement. Overall, CNCC members found the scientific and administrative coordination of EUROCORES 'excellent' (7) or 'good' (4).

Financial administration and support from the national research funding agency was also rated 'excellent' (5) or 'good' (6) by all.

1.2.3 Collaboration between involved Partners

A total of five Collaborative Research Projects (CRPs), representing 11 countries, were selected for funding consisting of 25 Individual Research Projects and eight projects with Associated Status. The CRPs that were selected varied in size and composition:

- BASIC – Project leader: Dr. Andreas Roepstorff, University of Aarhus, Denmark with collaboration from 7 countries (DK, FR, UK, USA, IT, CA, DE) through 6 PIs & 4 APs.
- Boundaries of Mind – Project leader: Dr. Tjeerd Jellema, University of Hull, UK with collaboration from 2 other countries (NL, BE) through 2 PIs.
- CEWR – Project leader: Professor Yann Coello, Université de Lille, France with collaboration from 4 countries (ES, FR, NL, UK) through 3 PIs and 2 APs.
- CONTACT – Project leader: Professor Cristiano Castelfranchi, Istituto di Scienze e Tecnologie della Cognizione (CNR), Roma, Italy with collaboration from 4 countries (UK, IT,NL,DE) through 4 PIs and 1 AP.
- METACOGNITION – Project leader: Professor Joëlle Proust, Institut Jean-Nicod, Paris, France with collaboration from 5 countries (FR, AT, UK, USA, DE) through 5 PIs and 1 AP.

1.3 Activities undertaken and outputs

The launch of the CNCC programme happened at a 2-day conference in Copenhagen on 12-14th November 2006. The conference, hosted by the University of Copenhagen, assembled a wide range of scientists in the field of Consciousness Studies, whether from the humanities, social or natural sciences who were given a chance to meet, network and discuss across their fields of specialisation. The emphasis was on finding connections between the different areas of research that participants were involved in with the aim of creating a bigger picture. On the programme were outlines of the five CRPs, presentations of other current initiatives in consciousness research, knowledge-sharing sessions engaging all participants in exploring shared interests and a practical facilitated workshop to help participants collaborate across disciplines on how to design and propose scholarly networking activities for the CNCC programme.

The main aim of the CNCC Programme was to form and fund robust international and multidisciplinary research teams that develop new avenues for consciousness research from a variety of perspectives. All the selected CRPs shared the novel perspective of consciousness which suggested that a complex interaction across different scientific dimensions and disciplines is needed.

The five CRPs of the CNCC Programme were working on the following issues.

1.3.1 BASIC - Brain, Agency, Self, Inter-subjectivity and Consciousness

Researchers in BASIC worked on the interface between neuroscience, phenomenology and cognitive research. While some focused on making neuroscientific facts, others explored links between agency, inter-subjectivity, self and consciousness and related these to developments in brain science. The aim was to further develop both empirical research and conceptual refinement, integrating into an interdisciplinary research field whose epistemological validity is supported by a solid anchoring in well-established research traditions.

D. Case Studies

Many BASIC researchers have organised and participated in conferences and in research stays with other CNCC research projects. Key events included the co-organisation of the summer schools 'The Sense of Body' (University of Bologna, June 2008) and 'Social Cognition and Social Narrative' (San Marino, July 2009) and of the 'CNCC PhD Essay Award'. One very important development, brought out via interactions primarily with the CONTACT group, has been an increased awareness among BASIC researchers of the importance of objects and other elements of the environment for creating and stabilising cognitive worlds. This exploration of an extended mind approach appears important for mapping out links between cognitive processes and cultural dynamics, as expressed in work on cultural object use.

1.3.2 Boundaries of Mind - Unconscious Boundaries of Mind; research into the extended mind hypothesis

This project studied how interaction with the environment can alter our way of conceiving things, so-called (re)conceptualisation, and the factors that facilitate or impede it. It investigated the influence of preconceptions, the role of our visual system and the limits to the flexibility to switch concepts in normal and clinical populations. The major aim was to explore the boundaries (possibilities/limitations) of the subconscious mind in its attempts to create certainties on the basis of an inherently ambiguous world. Collaboration between the three partners in this consortium quickly extended to include input from research groups in other CNCC CRPs, among others the CEWR (during workshops in Amsterdam and Lille) which alerted them to new ways of seeing their theories and sparked some of their best experiments. They were inspired by the philosophical perspectives and the theory of mind presented by the Metacognition CRP in several symposia, and the interpretation of their work was heavily influenced by members of the BASIC consortium, with whom they were able to arrange a Short Term Visit with ESF funding.

1.3.3 CEWR - The Conscious Experience of What is Reachable: neural, behavioural, cultural and philosophical aspects

Being conscious of our environment implies that we are conscious of the actions that can be performed within it. Spatial boundaries exist in the cognitive being that organise the external world as a function of what is reachable with the body. The overall aim of the CEWR project was to investigate the phenomenological experience of the boundary of peri-personal space, and to evaluate to which extent it depends on interaction between sensory and motor representations. Participation in the CNCC programme has definitely influenced the research of the collaborating teams by providing the opportunity to associate research experts on perception, action and consciousness within a multidisciplinary approach. The benefit of this approach could be seen in the deep discussions i of experimental work inside the cross-disciplinary team and the contributions of philosophers and neuroscientists to the interpretation of empirical data.

1.3.4 CONTACT - Consciousness in Interaction. The Role of the Natural and Social Environment in Shaping Consciousness

The brains and bodies of cognitive being (humans and animals) interact dynamically with both their natural and social environments. The CONTACT project opposed the claim that brain activity by itself enables conscious experience and instead investigated the claim that explaining consciousness requires studying the interactions of animals and humans – and their brains – with the environment. All the different facets of conscious experience were investigated under the assumption that they originate, develop and are modulated through interaction. This interactionist approach was the main novelty of the CONTACT research project. In addition, special emphasis was also given to the affective features and cultural dimension of consciousness. Collaboration and exchange of ideas within CNCC has been a key factor in fostering the research of this CRP.

1.3.5 METACOGNITION – Metacognition as a Precursor to Self-Consciousness: evolution, development and epistemology

Metacognition – thinking about thinking – may not be uniquely human, according to new experimental paradigms. This project critically examined the existence and nature of metacognitive abilities in non-human primates and developed comparative knowledge of metacognitive processes, by exploring how similar these capacities are in non-human animals, human children and human adults. It also examined how metacognitive processes contribute to self-consciousness. The CNCC programme made possible a rare collaboration among researchers from very diverse fields that had competing, incompatible views on the phenomenon under study. While some see metacognition as strongly dependent upon mindreading abilities, others analyse metacognition in non-metarepresentational terms. This interesting blend of challenges allowed experimentalists to come up with more controlled empirical methods for testing metacognition in non-linguistic animals as well as in human children

1.3.6 Collaboration and Networking

According to an evaluation carried out by an ESF Review Panel at the end of the programme[124], one of the key strengths of the CNCC programme was the strong inter-disciplinary cooperation that it instigated between a wide range of international research communities who had not previously worked together. The programme partners not only succeeded in cooperating across disciplines, they also managed to combine a variety of different methodologies under the joint core research area of consciousness. What stood out was the interaction and synergies created between the natural and social sciences and the way in which philosophical and empirical investigations were integrated. Methodologies typically associated with one field of research were combined with those from another field creating new interesting results, for example combining theoretical approaches, such as generating models and hypothesis with biological measurements, such as neuro-imaging. This approach turned out to be extremely fruitful for the results of the programme, and in the opinion of the Review Panel, it was this unique way of collaborating that made the CNCC notably different from other large-scale research programmes they had come across.

Likewise, the CNCC has provided an impressive, well-managed platform for networking between project members. A wide choice of events, ranging from small, specialised workshops to large high-profile conferences, have given participants from the different CRPs amble opportunities to meet and discuss their work. This has contributed to creating strong relations between researchers from different fields and different countries, making the cross-disciplinary facet of the programme especially successful. As emphasised by the review panel, this aspect was stressed in the final reports of the CRPs as being of particular value for the success of the programme and many gave examples of the inspiration and benefits they had gained from taking part in the CNCC's wider networking activities.

The collaboration between the research organisations involved in CNCC has also brought benefits to younger generations of researchers through a series of exchanges and the specific CNCC summer schools that were organised. The CNCC PhD Essay Award is another initiative that has contributed to creating a strong network of young researchers who will have a much broader network of contacts and employment opportunities in future.

In the survey for this study, the CRP partners were asked how they viewed different aspects of the partnership and collaboration with other organisations; a little less than half rated this as

[124] Consensus Statement CNCC Review Panel 'Final Evaluation'

'excellent' but a majority of CNCC partners found that the way their partnerships worked was 'good'.

1.3.7 Added value

The above mentioned synergies created between communities from the natural and social sciences and the integration of philosophical and empirical methodologies and investigations appear to constitute the main added value of the CNCC programme, without which the scientific results are unlikely to have been achieved. The global approach of the programme, involving partners from around Europe, but especially also from the US and Canada, has further increased the value-added given the difference in focus and approach in the research on consciousness found on the two sides of the Atlantic, which have met and started to integrate through this programme.

1.3.8 Scientific and other Outputs

In terms of outputs, the CNCC programme has resulted in a wide variety of high-quality, original research, as stressed in the final evaluation. The researchers that took part in the different CRPs have also produced a remarkable number of high-profile publications; many of the papers have appeared in leading scientific journals or collections. Although there were some differences across CRPs, in general, the Review Panel considered the CNCC research outputs to be of good or excellent quality. The CNCC Highlights brochure mentions more than 25 publications, but these are just the most important selection, many more were produced.

There was also an impressive number of lectures, presentations and other more formal events which helped to spread the results of the CNCC research widely. The CNCC website alone mentions some 20 high-profile events across Europe and North America in the years between the launch conference in November 2006 and the final conference in October 2009. These ranged from smaller expert meetings and workshops, CNCC sessions with all CRPs, through to summer schools and large high-profile conferences.

1.3.9 Dissemination

The CNCC programme appears to have achieved an impressive outreach through the large quantity of high-profile publications produced and the many presentations, invited lectures and conferences they have been involved in. Their research has managed to reach a wide audience of European and North American researchers, but also readers beyond traditional academic circles with papers published in well-known magazines like *New Scientist*, *Neuron*, *Science* and *Nature* – which have ensured a more wide-spread dissemination. In its final evaluation, the Review Panel comments on the strength of the EUROCORES funding model in that it raises visibility while the activities are taking place, rather than with the usual time lag in reporting that is typical in research circles.

1.4 Results and impacts

An important result of the CNCC programme, according to the final evaluation by the Review Panel, is the extent to which the separate CRPs have managed to converge on related ideas to create a coherent vision that was not originally envisaged in their proposals. Their exchange of ideas across disciplines and their openness to resolving conflicting notions has significantly changed the focus of consciousness studies and has shown the extent to which multi-disciplinary scientific collaboration can be successful. Considering that the teams incorporated researchers

from fields as diverse as neuroscience, experimental psychology, philosophy and anthropology, these are all the more impressive achievements.

The results from each of the CRPs have the potential to coherently illuminate and augment the findings from other CRPs in important ways. However, it is particularly the work of the three largest CRPs that stands out, as described below:

The **BASIC team** has significantly advanced the understanding of subjectivity in several important respects, to do with the interplay between extended cognition and inter-subjectivity and the role of narrative in social cognition. From a methodological point of view, this has led to novel attempts at integrating cultural and social processes and dynamics into research on consciousness and social cognition.

The **CONTACT team** has shown that consciousness cannot be studied in isolation from an internalist perspective, but requires an understanding of the relationship between consciousness and interactions with the natural and social environment. This was supported by the findings of the BOUNDARIES team, which demonstrated the need to take account of individual differences in investigations into the character of conscious experience. In line with this, the CEWR team demonstrated how individuals' perception of the boundary of their peripersonal space matters to their consciousness.

Finally, the **METACOGNITION team** worked on finding arguments for dissociating metacognition and mind-reading. Based on comparisons between humans and other primates, their work suggested that humans develop implicit forms of metacognition that are independent from mind-reading. This was seen to be consistent with the fact that metacognition may be a precursor of self-consciousness.

The survey asked respondents what outcomes they had achieved since participating in the CNCC programme that could be directly attributed to their participation. Nearly all said they had established ongoing research networks/partnerships and had published peer reviewed articles or book chapters. About half said their participation had led to further research funding from either national or European sources; a third mentioned national media coverage and a couple had established new research facilities/centres; three had made breakthrough research discoveries and two had won academic prizes.

Impacts

An important impact of the CNCC programme that could be seen with immediate effect was the professional relations created between researchers from different disciplines, countries and continents, which would not otherwise have occurred, and which have paved the way for future collaborations in new projects. The different teams have continued to work together on a number of other multi-disciplinary projects, for example a Marie Curie research-training network on embodied intersubjectivity and a trans-Atlantic research project on culture, cognition and brain activity (BASIC), or a project on knowledge, metacognition and modes of justification (METACOGNITON). Members of these two CRPs have furthermore joined forces to work on another EUROCORES programme "Understanding and Misunderstanding: Cognition, Communication and Culture".

The impact of these strong relations can clearly be seen within younger generations of researchers who, by benefitting from CNCC summer schools and exchanges, are now able to work across disciplines and enjoy much broader networks and career opportunities.

D. Case Studies

When CNCC participants were asked in the survey what they thought was the most important benefit they gained from having participated, practically all stressed the interdisciplinary cooperation and the personal contacts and new channels opened to them.

Overall, there seems to be a wealth of evidence that the work of the CNCC has raised Europe's profile in the study of consciousness through a range of new and distinctive research initiatives that will have a long life beyond the end of the CNCC programme.

1.5 Conclusions

The strategic relevance of the CNCC programme cannot be disputed – unravelling the mysteries of consciousness is considered one of the major challenges of modern science and the topic is at the forefront of the scientific arena. But it is the fact that it was decided to take a cross-disciplinary approach to tackling the issue that has been the basis for the programme's success. Creating a framework where researchers from the different disciplines of humanities, social sciences and natural sciences could come together to build joint research projects has been extremely fruitful, both in terms of creating new networks of researchers working across traditional boundaries, but also in terms of advancing existing knowledge through the development of novel ideas and theories.

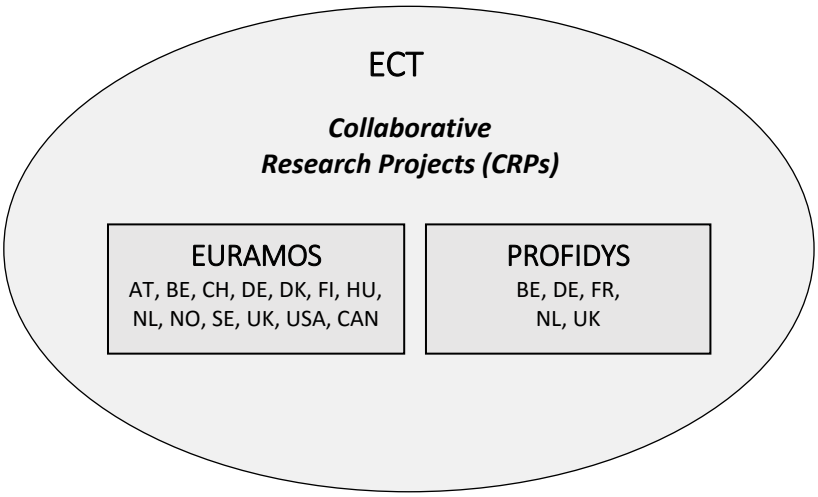
According to the final evaluation of the Review Panel, the CNCC programme was a remarkable success. Its main strengths, in their view, has been the cross-disciplinary cooperation and the European integration that it has fostered, not to mention the contribution to creating a new generation of young researchers with a much more multi-disciplinary outlook. The programme was seen as a pioneering initiative that should serve as an inspiration to future programmes in this field and would constitute a valuable model for any networking scheme wanting to advance research by creating links between disciplines.

In terms of recommendations for the future, it was thought that a more structured approach to the training of junior researchers could have been adopted, in spite of the benefits that were created in this area. Moreover, the dissemination of CNCC results was seen to be too focused on scientific communities and not enough on the public at large.

The importance of continuing the scientific cross-disciplinary dialogue started as a result of the CNCC programme is seen as paramount for the further advancement of consciousness research.

D. Case Studies

Case Study 2: Pan-European Clinical Trials (ECT)



1.1 Overview

The Pan-European Clinical Trials (ECT) was a EUROCORES programme that coordinated funding for pan-European, non-commercial, investigator-driven clinical trials (IDCTs) aimed at two rare bone conditions in the paediatric population in compliance with Good Clinical Practices (GCP) and current national and European regulations. It consists of two CRPs:

EURAMOS (European and American Osteosarcoma Study Group), a randomised trial designed to optimize treatment strategies for patients with resectable osteosarcoma based on histological response to pre-operative chemotherapy. It is a network of four trial groups: the Cooperative Osteosarcoma Study Group (COSS covering Austria, Germany, Hungary and Switzerland), the Scandinavian Sarcoma Group (SSG covering Denmark, Finland, Iceland, Norway and Sweden), the European Osteosarcoma Intergroup (EOI covering the UK, Belgium and Netherlands) and the North American Children's Oncology Group (COG covering USA and Canada).

PROFIDYS (Prevention of bone morbidity using a bisphosphonate in fibrous dysplasia of bone), a randomised placebo-controlled trial designed to assess the safety, tolerability and efficacy of an oral bisphosphonate in the reduction of bone pain and osteolytic lesions in patients with fibrous dysplasia of the bone.

The ECT programme was launched in early 2005 and ran for six years. In total nine funding organisations from eight different European countries supported the programme: Fonds National de la Recherche Scientifique, Belgium; Fonds voor Wetenschappelijk Onderzoek, Belgium; Forskningsstyrelsen, Denmark; Suomen Akatemia, Finland; Institut National de la Santé et de la Recherche Médicale, France; Deutsche Forschungsgemeinschaft, Germany; Norges forskningsråd, Norway, ZonMw, *The Netherlands Organisation for Health Research and Development*, the Netherlands; Medical Research Council, UK; and Assistance Publique-Hôspitaux de Paris, France.

D. Case Studies

1.2 Background

EURAMOS aimed to improve treatment for osteosarcoma which is the most common bone cancer in children, adolescents and young adults, but a rare disease with an annual incidence of 2-3 cases per million per year. EURAMOS aimed to evaluate therapeutic strategies adapted to the response of the primary tumour to preoperative induction chemotherapy. The EURAMOS Project Leader, Professor Stefan Bielack, explained that although there were several study groups around the world that have been working on this field for over the past 20 years, there were some questions that remained unanswered and in order to answer these, a larger number of patients were needed: "As the disease is quite rare, the study would run for decades if the research would be performed within one country. The international dimension of the EUROCORES scheme allowed us to reach the critical mass needed to perform a meaningful analysis".

PROFIDYS aimed to evaluate the effect of an orally administered bisphosphonate (risedronate) to test the hypothesis that it reduces bone pain and improves osteolytic lesions in patients with fibrous dysplasia of bone (FD). FD is a rare congenital bone disease characterized by replacement of normal bone by a fibrous tissue, accounts for about 2.5% of bone disorders and 7% of benign bone "tumours or pseudo-tumours" and affects mainly adolescents and young adults. Although pilot studies have suggested that bisphosphonates may alleviate bone pain and improves osteolytic lesions, it has not been confirmed in a double blind placebo-controlled trial (a placebo effect could account for as much as 30 to 40% of bone pain relief) and it was also needed to assess the bone response using prospective X-rays.

1.2.1 Overview of selection process[125]

The feedback on the EUROCORES application procedure from the interviewees and the survey respondents is quite positive. According to EURAMOS Project Leader, the support received after the first stage of the procedure for writing the proposal (they received EUR 20,000 after the first stage) was extremely helpful and allowed them to employ the time needed to that end.

It was felt that the most difficult part of the selection process was to obtain funding for individual projects from national agencies. Researchers interviewed stressed that even though they were recommended for funding by the ESF, some national funding agencies decided not to support some individual projects. In this regard it was considered that it would have been more efficient if the national funding agencies would have decided upfront whether they wanted to support a particular EUROCORES project or not, so the applicants did not have to deal with these issues after the approval by the ESF.

In relation to the question of the key to the theme being accepted as a programme, one of the interviewees considered that, in addition to the scientific questions, the key factor was that they were able to demonstrate they had experience and a functional infrastructure behind the project. They already were working on the theme with several European countries. Therefore, their credibility is considered to be the main key factor of the selection.

Overall, Member Organisations funding the programme were very important at the first stage, but less active once the programme was launched. The EURAMOS Project Leader interviewed highlighted some challenges they had to overcome regarding the funding of the programme. For example, the Austrian MO dropped out of the scheme because they were not interested in

[125] Predominantly based on EURAMOS' participants responses

supporting the programme, forcing the Austrian researcher to search for an alternative funding opportunity, which took several years. Similarly, the national funding organisation from Sweden also dropped out of the scheme and the Swedish team were forced to look for alternative funding. On the contrary, other MOs, such as the German national funding organisation, were extremely supportive during the whole process.

As concerned the support received by the ESF coordinator and the collaboration between the ESF and the CRPs, the feedback is quite positive – "the ESF coordinator was very supportive and communication worked quite well".

1.3 Activities undertaken and outputs

There is no information available about the launch of PROFIDYS project. The EURAMOS trial did not have an official launching event but a large meeting in Stuttgart in 2005, which coincided with the recruitment of the first patients into the trial. Representatives from the funding organisations, policymakers, regulatory agencies, doctors, scientists, etc., discussed the EURAMOS 1 trial experience (e.g. how to approach an international trial), as well as the challenges that had to be overcome for launching and running the project. This conference was attended by nearly 200 delegates from across the world.

Throughout the course of the ECT Programme, numerous meetings, conferences, workshops, presentations and other events took place in several countries. Apart from the annual networking meetings of each CRP held in different countries, there were other activities funded by EUROCORES scheme, such as[126]:

Dissemination travel grants to support the participation at different events including the 15th Annual Meeting of Connective Tissue Sarcoma (CTOS), Miami, Florida,(4-7 November 2009); the 23rd Annual Meeting of the European Musculo-Skeletal Oncology Society (EMSOS), (5-7 May 2010), Birmingham, UK; the 2010 American Society of Clinical Oncology (ASCO) Annual Meeting, (4-8 June 2010), Chicago, Illinois, the 37th European Symposium on Calcified Tissues organised by the European Calcified Tissue Society (ECTS), (26-30 June 2010) and the ECTS Training Course on Clinical Trials, (26 June 2010), Glasgow, UK; the training course "Adaptive Designs in Clinical Drug Development", 2-3 February 2011, London (UK) and the PROFIDYS Steering Committee Meeting, Athens, 9 May at the European Calcified Tissue Society (ECTS) Congress Fibrous Dysplasia of Bone: Patient Meeting, organised by Professor Roland Chapurlat, (16 April 2011), Lyon, France and Dissemination Travel Grant allocated to Katja Zils to attend the International Society for Pediatric Oncology (SIOP) Meeting, (26-30 October 2011), Auckland, New Zealand.

Training sessions to contribute to the development of the necessary expertise for the implementation and management of multi-centre pan-European academic clinical trials: the "First Training Course on Pan-European Clinical Trials under current EU regulations" was held in Stuttgart on 2-3 December 2005 and attended by 150 data managers, study nurses and junior clinical investigators; and the Second Pan-European Clinical Trial Training Course organised in Oslo on 5-6 October 2006. Also other training activities like the Paediatric Clinical Trials Session on Osteosarcoma within the 13th European Cancer Conference (ECCO 13), in Paris, (1st November 2005); the "Managing an international clinical trial: Roles, Responsibilities and mechanisms of the

[126] The full list of activities and publications is listed in the Final report of the ECT Programme. http://www.esf.org/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/be_user/activities/EUROCORES/ECT/Eurocores_2012_ECT_final_report.pdf&t=1437842135&hash=577658d4f4a938af1b75e6454ac092ccdabfece0

EURAMOS-1 trial organizations and committees" London, UK, 4-5 May 2006; Pan-European Clinical Trials under current EU regulations - A training course for data managers, study nurses, and junior clinical investigators, London, UK, 24-25 January 2008.

Workshops, conferences and other meetings, organised by the Project Leaders and Principal Investigators of the programme: Successful multinational implementation of the European and American Osteosarcoma Study EURAMOS-1 within the European Science Foundation's ECT-EUROCORES scheme, 19th Annual Meeting of the European Musculo-Skeletal Oncology Society (EMSOS), Moscow, 26 May 2006; "Clinical Investigator Training – Pan-European Clinical Trial Courses developed by the EUROCORES ECT Programme"; Global Profidys Conference (22 January) Lyon, France; "Future Clinical Trials for Adjuvant Treatment of Osteosarcoma – Prioritising the Questions", 15-16 March 2010, London UK; EURAMOS Working Group meeting during Connective Oncology Society (CTOS) meeting, 10-13 November 2010, Paris, France; Fibrous Dysplasia of Bone: Patient Meeting, 16 April 2011, Lyon, France; Integration of clinical trials with tumour biology, 29-30 June 2011, Leiden, The Netherlands, among others.

In addition, the lead researchers participated actively in different important **international meetings**. For instance, the 25th Annual Meeting of the European Musculo-Skeletal Oncology Society (EMSOS) (May, Bologna, Italy), the 38th Annual Conference of the International Society of Paediatric Oncology (SIOP), Geneva, 19 September 2006 ("EURAMOS 1 – an international randomised study in a rare cancer: last of a soon-to-be extinct species or hope for the future?") and the Conference on Clinical Trials in Serbia: Looking upon GCP, Regulatory Issues and Bio-ethics, co-organised by the European Forum for Good Clinical Practice and the Medicine and Medical Device Agency of Serbia, Belgrade, 5 September 2006.

In addition, a large number of publications, books, and articles were produced during the course of the CRPs, and interviewees confirmed that more publications are under development.

1.3.1 Aim and focus of the programme

The EURAMOS project addressed whether changing systemic treatment on the basis of histological response to preoperative chemotherapy improves event-free survival (EFS) and overall survival for patients with respectable osteosarcoma. Its primary objectives were:

- In a randomised trial, to examine whether the addition of ifosfamide and etoposide (IE) to post-operative chemotherapy with cisplatin, doxorubicin and methotrexate improves event-free survival for patients with resectable osteosarcoma and a poor histological response to 10 weeks of pre-operative chemotherapy.
- In a randomised trial, to examine whether the addition of interferon-a (ifn) as maintenance therapy after post-operative chemotherapy with cisplatin, doxorubicin and methotrexate improves event-free survival for patients with resectable osteosarcoma and a good histological response to 10 weeks of pre-operative chemotherapy.

The PROFIDYS project aimed at confirm whether the effect of an orally administered bisphosphonate (risedronate) it reduces bone pain and improves osteolytic lesions in patients with fibrous dysplasia of bone. The primary research questions were:

- What is the efficacy of the bisphosphonate risedronate (associated to calcium and vitamin D, or to calcium, oral phosphate, and calcitriol in patients who have renal phosphate wasting) to improve bone pain in patients with fibrous dysplasia of bone?

- What is the efficacy of the bisphosphonate risedronate (associated to calcium and vitamin D, and to oral phosphate in patients who have renal phosphate wasting) to improve osteolytic lesions in patients with fibrous dysplasia of bone?

1.3.2 Collaboration and networking

Compared to other EUROCORES programmes, the EURAMOS CRP structure was quite particular, as the different groups worked closely together in order to organise the international recruitment and run the randomised clinical trial. The partners formed transnational structures in order to achieve the aim of the project. The main structures were:

- A Trial Management Group (TMG) composed of investigators and data centre representatives, which handles the day-to-day running of the trial;
- An Independent Data Monitoring Committee (IDMC) composed of independent members; and
- A Trial Steering Committee (TSC) composed of independent members and representatives from the TMG.

The last two structures dealt with the trial oversight and met regularly in person or via teleconference.

Each of the four groups collected and coded their own data according to a predefined Common Data Set that was sent regularly to a Coordinating Data Centre (CDC) (established at the Medical Research Council Clinical Trials Unit) for its compilation and analysis.

In addition, the EURAMOS participants, together with the ESF, organised the aforementioned training courses on pan-European clinical trial for junior physicians and data managers involved in the trial on a local level that helped to increase networking and collaboration. The EURAMOS Project Leader noted that although they did not start from zero because they were already collaborating with most of the partners, the ECT programme helped to expand the cooperation and bring together an adequate group of people. In addition it was stressed that the support received for networking from the ESF was very helpful and especially important because there were more than 200 institutions working together. One of the Principal Investigators interviewed noted that “without the intensive international cooperation it would not have been possible to address the important scientific questions in osteosarcoma”.

The EURAMOS cooperation will continue behind the ECT programme as the four groups have expressed their commitment to continue their cooperation in future osteosarcoma trials.

With regards to PROFIDYS, two reference centres were created in France: the first one in Paris for Constitutive Bone Diseases and the second in Lyon for Fibrous dysplasia of bone and McCune-Albright syndrome. Both centres worked closely with a third reference centre for Rare Endocrine Diseases of Growth, with additional special emphasis on the paediatric and endocrine care of these patients. This network also collaborated closely with the French patients association ASSYMCAL which main aim is to improve the clinical management of patient with fibrous dysplasia.

The integration of both CRPs it was recognised as modest. The collaboration mainly occurred at networking and dissemination events. Although participants in both CRPs met several times, their professional background was quite different. Unlike EURAMOS, the PROFIDYS project had to

create their network from start, and they faced some challenges that delayed the launch of the project, and the exchange of knowledge was more limited.

1.3.3 Scientific and other outputs

The EURAMOS CRP is an example of a successfully conducted international collaboration to evaluate new approaches to treatment in a rare cancer. It created a platform for future trials to be undertaken rapidly and to the highest standards. The four EURAMOS groups were able to complete the recruitment in 2011 and started the analysis in order to response the primary questions of the project. The first outcome of the good response cohort was reported during the annual meeting of the American Society of Medical Oncology, which is the most important clinical oncology meeting; and the second outcome of the poor response cohort was reported last year at the meeting of the Connective Tissue Oncology society, which is the main society dealing with tumour.

In addition to achieving the aim of the project and respond to the primary questions, the researchers have published an large number of papers in highly ranked journals and they are in the process of achieving secondary outcomes and expect to publish other collaborative papers in the next years. Several presentations in international conferences also took place during the project period. Thanks to the project there is today a common protocol, a common structure and a common data centre, which is an important output of EURAMOS. The international collaboration cemented during the project will continue and more publications are expected. This is part of the legacy of the programme.

For its part, PROFIDYS' researchers have also published a large number of papers in scientific journals, as well as books and articles. In addition to the above-mentioned creation of two new reference centres in France, an important outcome of the project was the development of recommendations and guidelines for the management of fibrous dysplasia and McCune-Albright syndrome.

The scientific highlights of the CRPs are summarised in the following table:

CRP	Aims	Scientific highlights
EURAMOS	To evaluate whether changing systemic treatment on the basis of histological response to preoperative chemotherapy improves event-free survival (EFS) and overall survival for patients with resectable osteosarcoma.	The results of the trial confirm that the standard of care for resectable osteosarcoma is for no adjustment to post-operative treatment to be made on basis of histological response.
PROFIDYS	To confirm whether the effect of an orally administered bisphosphonate (risedronate) it reduces bone pain and improves osteolytic lesions in patients with fibrous dysplasia of bone.	*The project is still on-going and no study results have been posted so far. The project was recruiting participants till the end of 2014 and the final analysis is scheduled for 2017.*[127]

The dissemination of the ECT programme was undertaken mainly through the aforementioned dissemination travel grants that supported the active participation and oral presentations in scientific meetings and international conferences, the training sessions/courses and workshops, as

[127] Pan-European Clinical Trials (ECT). Final Report.

well as the several articles published in international well recognised and prestigious journals, books and book chapters, lectures and press releases and presentations to patient/parent groups. The help provided by the ESF in this regard was especially appreciated. They were very active and the collaboration and support for promoting the study, organising the training courses and so on, was quite good.

Both CRPs also disseminated their activities and outcomes through their respective websites.[128]

1.4 Results and impacts

Results and impact of the ECT programme as a whole are not possible to evaluate, as the Review Panel did not receive data from PROFIDYS in time for the Final Report. The project was recruiting participants till the end of 2014 and the final analysis is scheduled for 2017.

As concerns EURAMOS, all participants that have contributed to the evaluation and the Review Panel conclusions agreed in considering that the project was very successful with achievements that go beyond the initial objectives.

Professor Stefan Bielack stressed that the main result of their project is that they were able to address the two main scientific questions and respond to the primary questions of the project. Over the 75 months of the project, 2,260 patients were recruited by 326 centres in 17 countries. This is this largest ever osteosarcoma study performed (the largest previous prospective osteosarcoma study performed recruited less than 700 patients). 1,334 patients (59%) were randomised after surgery and good response was reported by 1,041; 716 patients were randomised. There was no difference in EFS (event-free survival). Poor response was reported in 1,059 patients; 618 patients were randomised. There was no difference in EFS either. This has an important clinical significance for patients with resectable osteosarcoma.

The EURAMOS project development and results are especially significant, and not only for the sarcoma community. It coincided with the adaptation of the Clinical Trials Directive 2001/20/EC introduced by the EU with the aim at harmonising administrative provisions governing clinical trials across the Union and introducing greater protection and safety for patients and the project has helped to demonstrate a successful implementation of a Pan-European Clinical Trial under the new regulation. The knowledge gained on how to run a non-commercial clinical trial to comply with the new EU regulations was very important.

With regard to the added value of EUROCORES, the EURAMOS participants interviewed agreed that it would not have been possible to manage an international project of such a large scale (more than 300 institutions and 17 countries involved within Europe and overseas) without the support of the EUROCORES scheme.

The financing and the common structure needed for running a clinical trial after the implementation of the EU Directive was possible thanks to EUROCORES. At the time of implementation, there were no other funding sources available for this kind of initiative where the cross-border international dimension of the programme was crucial. In addition, one interviewee also highlighted the numerous publications, books, and articles that have been published, or are expected to be published, under the project, as well as the creation of a sustainable and international network treating osteosarcoma.

[128] The dissemination activities are detailed in the Final Report.

Finally, it was also stressed that without the EUROCORES support it would have been very difficult to disseminate the outputs and results of the EURAMOS project "EUROCORES has improved our visibility and outstanding in the scientific community".

1.5 Challenges to the projects and how these were met

There were three main challenges (both mentioned in previous sections). The first challenge related to the problems at the early stage of EURAMOS project because some national funding agencies (e.g. Austria or Sweden) decided not to support some individual projects after the recommendation and approval by the ESF. This forced some institutions to look for alternative sources and led to, for example, a delayed involvement by the Austrian researchers.

The second issue raised was the aforementioned implementation of the EU Clinical Trials Directive 2001/20/EC that introduced many changes regarding the regulation when running a clinical trial. This slowed down the launch of the programme. As a consequence, the first recruitment of a patient was made in 2005, when originally was planned to take place in 2003 or 2004. Despite the delay, it was in the end possible to achieve the initial objectives.

According to the ECT Final Report, PROFIDYS' main challenge was the limited size of the project in terms of countries involved and patients recruited. In fact, researchers found many difficulties and practical problems on a national basis in order to be able to start their respective trials. There were delays and lack of institutional support. Ultimately this led to the cancelled involvement of three national researchers who initially agreed to participate in the project (e.g. UK, Germany and Italy).

1.6 Conclusions

As mentioned above, the Review Panel was not able to evaluate the ECT programme as a whole because the PROFIDYS report was submitted after the deadline established. Therefore, the final evaluation is based only on the EURAMOS final report.

By the time of the drafting of the consensus statement, the final results were not published yet. However the Review Panel predicted that these final results would be very useful for medical and paediatric oncology worldwide and this has also been corroborated through our case study interviews. The Review Panel and the researchers interviewed equally stressed that the knowledge derived from EURAMOS experience is likely to become a model for running independent clinical trials in rare diseases in the future.

Interdisciplinary research and international dimension were major features of EURAMOS and the added value of the project. A research of such a large scale needed the involvement of several different centres and countries from Europe and overseas to reach the critical mass of patients that would enable researchers to perform a statistically relevant analysis.

D. Case Studies

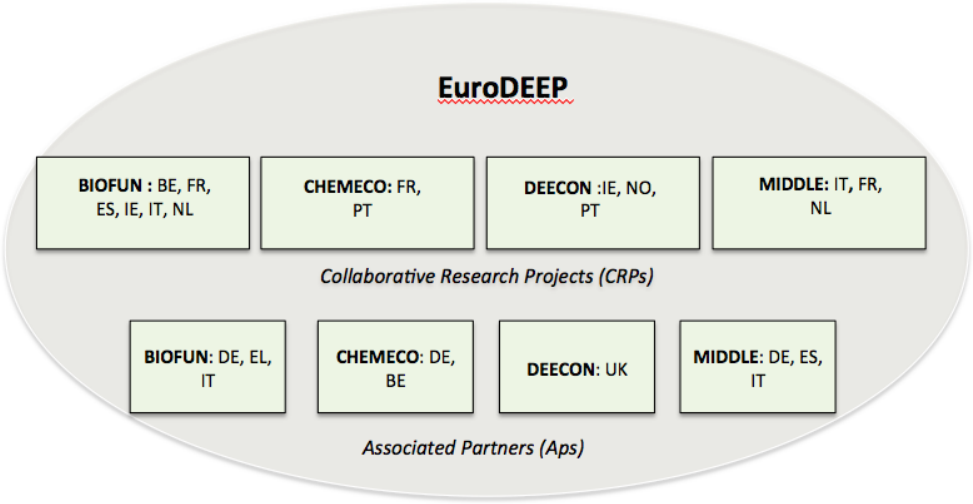
Annex

The table below summarize the Project leaders (PLs), Principal Investigators (PIs) and Associate Partners (APs) that have participated in the Programme:

CRP Acronym	PLs (Country)	PIs (Country)	APs (Country)
EURAMOS	Prof. Stefan Bielack *Klinikum Stuttgart – Olgahospital, (DE)*	Dr Catharina Dhooge Ghent University Hospital, Belgium Professor Sigbjørn Smeland Scandinavian Sarcoma Group, Oslo University Hospital, Norway Professor Ole Steen Nielsen Aarhus University Hospital, (DK) Professor Maija Tarkkanen Laboratory of Cytomolecular Genetics, University of Helsinki, (FI) Dr Jeremy Whelan European Osteosarcoma Intergroup, University College London (UK)	Professor Mark Lawrence Bernstein University of Nova Scotia / Dalhousie University, Canada Dr Mikael Eriksson Lund University Hospital, Sweden Dr Hans Gelderblom Leiden University Medical Centre, The Netherlands Dr Oskar Johannsson University Hospital of Iceland, Iceland Dr Leo Kager Medical University of Vienna, Austria Professor Thomas Kühne Universitätskinderspital beider Basel, Switzerland Dr Neyssa Marina Lucile Packard Children's Hospital at Stanford, USA Dr Zsuzsanna Papai Military Hospital, Budapest, Hungary Dr Jakob Anninga Leiden University Medical Centre, (NL)
PROFIDYS	Prof. Philippe Orcel *Assistance Publique Hôpitaux de Paris (FR)*	Prof. Roland Chapurlat *Hôpital Edouard Herriot, (FR)* Professor Jean-Pierre Devogelaer *Cliniques Universitaires Saint-Luc, (BE)* Professor Socrates E. Papapoulos *Leiden University Medical Centre, (NL)*	Dr Neveen A.T. Hamdy *Leiden University Medical Centre, (NL)*

D. Case Studies

Case Study 3: Ecosystem functioning and biodiversity in the deep sea (EuroDEEP)



1.1 Overview

'Ecosystem functioning and biodiversity in the deep sea' (EuroDEEP) was a medium-sized EUROCORES programme that consisted of four Collaborative Research Projects (CRPs). The programme ran from 2007 to 2011 covering different research areas on the deep-sea ecosystem.

The CRP 'Biodiversity and ecosystem functioning in contrasting southern European deep-sea environments: from viruses to megafauna' (BIOFUN) was led by Professor Francisco Sardà Amills (ES). Furthermore, eight principle investigators (BE, FR, ES, IE, IT, NL) and three Associated Partners (DE, EL, IT) took part in BIOFUN. The CRP 'Monitoring colonisation processes in chemosynthetic ecosystems' (CHEMECO) was led by Dr Françoise Gaill (FR) from 2009 to 2011 and then by Dr Sylvie Gaudron (FR). Four Principle Investigators (FR, PT) and two Associated Partners (DE, BE) took part of CHEMECO. The CPR 'Unravelling population connectivity for sustainable fisheries in the Deep Sea' (DEECON) was led by Professor Christian Stenseth (NO) and consisted of three Principle Investigators (IE, NO, PT) and one Associated Partner (UK). The CRP, 'Microbial Diversity in the Deepest Hypersaline Anoxic Lakes' (MIDDLE) was led by Dr Michail Yakimov (IT) and supported by three Principle Investigators (FR, NL) and four Associated Partners (DE, ES, IT).

In total, 12 funding agencies supported the EuroDEEP programme: Research Foundation Flanders (FWO) (BE); National Centre for Scientific Research (CNRS) (FR); French Research Institute for Exploitation of the Sea (Ifremer) (FR); National Institute for Development (IRD) (FR); Irish Research Council for Sciences, Engineering and Technology (IRCSET) (IE); National Research Council (CNR) (IT); Netherlands Organisation for Scientific Research (NWO) (NL); the Research Council of Norway (NO); Foundation for Science and Technology (FCT) (PT); Ministry of Education and Science (MEC) (ES).

1.2 Background

European contribution to deep-sea science is world leading. It also has a long history – European research in deep-sea science can be traced back to 19th century. During the last 20 years European research in the area has seen a substantial increase. The number of scientific

publications published in Europe has increased from 379 to 1,556 per year, which corresponds to a 310% increase. Deep-sea research is one component of the wider marine research that has profited from investment through the European Framework Programmes (from FP6 onwards).

Internationally, there are also growing expectations on the expected return on investment of deep-sea research. The number of international deep-sea patents has increased exponentially during the last 10 years, from approximately 10 in 2005, to more the 70 in 2015.[129]

The research undertaken as part of the EuroDEEP programme is significant for several reasons. The deep sea is one of the least studied environments on the planet, and research in the area is strongly linked to technological innovation.[130] As stressed by one interviewee, since little is known about the deep sea, additional research is likely to lead to significant discoveries that may have an impact for decades. It is possible, through interdisciplinary research, to understand how physical, geological and geochemical processes shape deep-sea habitats, control biological and biogeochemical processes and ultimately determine their relationships with the global biosphere. The interaction with the global biosphere is especially relevant for society as a whole.

Based on these factors, EuroDEEP aimed to explore further the deep-sea environment, assess in more detail the biological species and communities that inhabit it, and examine the physical and geochemical processes that shape the environment in which these communities live. The latter will help to describe, explain and predict variations of biodiversity within and between deep-sea habitats, their consequences for deep-sea ecosystem functioning, and the interactions of the deep sea with the global biosphere. Apart from understanding the deep-sea environment, the programme aimed to develop sustainable management and conservation options for the marine resources that will benefit society as a whole.[131]

Deep-sea research is an expensive undertaking – it is costly to organise cruises to collect data, and of course, infrastructure in the form of ships and equipment are needed. This – along with the international nature of marine research – makes it an ideal research area to co-fund across countries to increase efficiency (financially and intellectually).

Like the other EUROCORES programmes, the EuroDEEP projects were selected through a multi-stage process involving an international and independent Review Panel. The four CRPs that made up the EuroDEEP programme were selected and launched in 2007.

Nine EuroDEEP participants commented on the selection process in our evaluation survey. The feedback was largely positive. According to one Project Leader, the proposal selection itself was efficient, but there were other selection related challenges. Two CRPs involving research groups from Belgium and Germany, and that played key roles in the programme were not funded by their national agencies. These researchers would have been able to provide research space on ships (and which is the most expensive aspect about the programme). On the level of cooperation between ESF and MOs, one Project Leader assumes that some issues arose between ESF and the Belgium and German MOs as these countries decided against supporting EuroDEEP.

1.3 Activities undertaken and outputs

The EuroDEEP kick off meeting took place over a week in Taormina (Sicily) in 2007. It was a good opportunity for all the CRPs and the ESF to discuss the direction of the programme. However, throughout the programme the cooperation between the CRPs was somewhat uneven. The projects whose members knew each other beforehand had an advantage in terms of cooperation

[129] European Marine Board (2015) Delving Deeper Critical challenges for 21st century deep-sea research. Position Paper 22

[130] Interview feedback

[131] ibid.

within a CRP. Overall, there was little previous knowledge about the researchers in the other projects, and cooperation across CRPs was limited. One Project Leader says cooperation in the programme felt 'disconnected' and that the different specialisms of the CRPs did not complement each other. It was felt that although the programme achieved interdisciplinarity, cooperation was difficult in practice as the research topic was too broad. Cooperation between CRPs was also difficult as due to intellectual property concerns, for example the sharing of samples.

Survey respondents commented on how well the cooperation between different stakeholders worked. Four survey respondents already knew their team since the partnership was already in place. The majority of respondents did not know the other team members and they either tried to identify potential partners themselves (2) or they were approached to join a partnership by another organisation (3). In terms of how the respondents evaluated the cooperation, seven respondents argued that the programme brought together an appropriate group of individuals/organisations for this type of initiative (only one person opted for "don't know). Furthermore, six respondents rated cooperation overall good (5) or excellent (1). Two respondents opted for neutral in this respect.

The ESF Coordinator encouraged the Project Leaders to interact more, through e.g. co-developing events between the CRP, including workshops for the young researchers in the programme.

All the CRPs with the exception of CHEMECO had students or postdocs involved in the research. The lack of early career researchers in CHEMECO was as a result of the high costs involved in organising deep sea cruises, but this also hampered the research efforts. With a PhD student or postdoc involved in the project, it was felt that the CRP would have been more productive. In contrast, other of the four CRPs had strong had a strong training component. BIOFUN supported 5 postdocs, 9 PhD students and over 15 MsC students.

1.4 Results and impacts

It is a challenge to fairly gauge the results and impacts of EuroDEEP. Only five per cent of the results achieved were completed to be reported in time for the final evaluation report, which was published at the end of the programme.

Our investigations suggest that the programme was overall successful. According to our survey, almost all (93%) of the respondents say that the programme made a significant or fairly significant contribution to scientific knowledge. In particular the interdisciplinary and transnational dimensions were deemed to be key characteristics according to our survey. The review panel overseeing EuroDEEP made a particular comment on the "impressive" The list of publications in top-class journals.

Despite the challenges in collaboration, EuroDeep established new research networks among the participants and a number of breakthrough research discoveries. For example, the CHEMECO CRP developed a novel chemical colonization scheme, which has since been applied as the prevailing method in international research. The project also collected living organisms at an early stage of their life cycle whose further development was important to study.

The project demonstrated that there are previously unknown species living in the deep sea, and that the deep-sea ecosystem is more diverse than previously thought. This has led to new studies looking at the impact of climate change on the deep sea.

D. Case Studies

Selection of key achievements of the CRPs

BIOFUN: the most important achievement of the BIOFUN project was that, for the first time, all life components inhabiting deep-sea ecosystems were considered together. This provided the first insight on the biodiversity patterns among life kingdoms, and represented a basis for future research developments in the deep sea.

CHEMECO: CHEMECO managed to collect metazoans ay young stages, including heterotrophic species with some species new to science.

DEECON: this CRP combined methodologies such as otholith chemistry and shape analysis, multi-locus genetic markers, and oceanographic and other computer modelling and simulations, in order to understand mechanisms of population connectivity in selected deep-sea fishes. Oceanographers worked together with geneticists and marine ecologists to resolve common research issues, including characterizing dispersal and gene flow at various life history stages.

MIDDLE: the main highlight of this project consists of the fact that four Mediterranean Sea anoxic hypersaline deep-sea lakes (DHALs) were subjected for the first time to microbiological analyses during the activities of MIDDLE. Among these four lakes, two were discovered by the MIDDLE partners during the 2008 MIDDLE cruise.

Source: EuroDEEP final report

Other participants of the EUROCORES research have also gone on to win national research funding as well as EU funds.

1.5 Challenges to the projects and how these were met

According to the Project Leader of CHEMECO there were three major challenges. First of all, since the nature of the research requires the participation in field trips (i.e. to participate in cruises), the programme was very expensive and time consuming. A good example of that is the BIOFUN project. It included an intense fieldwork programme (2007-2009), with six major cruises in the Atlantic (Galicia Bank) and across the Mediterranean Sea. All these cruises were multidisciplinary and sampled the geological, physical and biological (from viruses to megafauna) components of the seafloor at 1,200, 2,000 and 3,000 m depth, as well as other extra depths depending on the cruise. This resulted in organisational and technological as well as time-constraint challenges. According to the Project Leader of CHEMECO, the expensive nature of the research also negatively impacted on the collaborations. She argues that since it is so expensive to collect data researchers cannot always cooperate with the same group but they have to focus on funding. This created some tensions in the programme.

The second challenge was the interdisciplinary nature of the programme. On the one hand sharing data/samples with other research laboratories was problematic due to organisational issues and due to intellectual property concerns.

Third, the results achieved by the programme are not immediately measurable. Because of the time consuming nature of ecological studies generally and the extent of the research, the final and most comprehensive results of the programme were not acknowledged in final report. According to the Project Leader of CHEMECO only 5% of the results of EuroDEEP were achieved at stage of final evaluation report.

1.6 Conclusions

Deep-sea research is a scientific field with a long history in Europe. Despite its longevity as a science, little is known about the deep-sea. Research in the area has great potential to improve our accumulated knowledge, and the deep-sea's interaction with the global biosphere is especially relevant considering our current challenges in tackling environmental problems and climate change.

EuroDEEP's final report states that *"EuroDEEP catalysed excellent research on bio-diversity in the deep sea, and on the mechanisms to generate it and maintain it by means of abiotic and biotic processes. EuroDEEP focused as well on the role of the deep-sea in the biogeochemical processes affecting the global biosphere, bringing together taxonomists, microbiologists, ecologists, physical and chemical oceanographers and geologists".*

Despite the documented challenges in cooperating across CRPs in EuroDEEP the border-less nature of the research field and the capital-intensive nature of scientific undertakings makes deep-sea research an area where broad national and scientific collaboration is necessary. This is a key European added value of the programme. Ultimately, the EuroDEEP programme also managed to show a high degree of international cooperation and to largely integrate the research projects under a common framework.

The main weakness of the programme was that it could not be carried out as originally envisaged at the theme proposal stage. "Many excellent"[132] laboratories were unable to partake in the programme as a result of national funding policies and commitment to funding.

[132] EuroDEEP final report

D. Case Studies

Case Study 4: Programme name: Functional genomic variation in the epilepsies (EuroEPINOMICS)

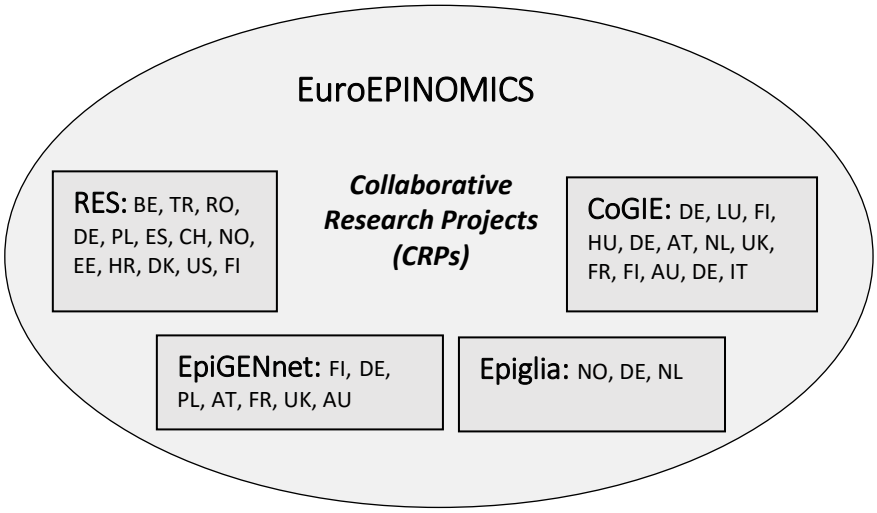


Figure 1 EuroEPINOMICS

1.2 Overview

The Functional genomic variation in the epilepsies (EuroEPINOMICS) programme's main objectives were to identify novel epilepsy genes and genetic variants predisposing to epilepsy and drug response, and to unravel molecular pathways. EuroEPINOMICS aimed to apply innovative molecular genetic techniques in large European cohorts of well-characterised epilepsy patients (N>8000) by combining the resources of former European collaborative projects (EPICURE, EPIGEN, EURIPIDES and EURAP). The programme also included pharmacogenetics studies in order to identify possible genetic risks affecting drug responses, side effects, refractoriness and teratogenicity, and comprehensive functional studies. EuroEPINOMICS made use of state-of-the-art techniques to elucidate the epileptogenic mechanisms of the identified genetic variants.

EuroEPINOMICS was made up of four CRPs:

1. Genetics of Rare Epilepsy Syndromes (RES) which aimed to decipher the genetic basis of many rare epilepsy syndromes with emphasis on epileptic encephalopathies;
2. Targets of Epileptogenesis and Pharmacoresistance in Brain Glial Cells (Epiglia) which is a translational research project aiming at unravelling the genetic and molecular pathways of temporal lobe epilepsy and febrile seizures;
3. Epigenetic Pathomechanisms Promoting Epileptogenesis in Focal and Generalised Epilepsies (EpiGENet) aimed to characterize common epigenetic pathomechanisms of epileptogenesis by utilizing both animal models and specimens from human brain;
4. Complex Genetics of Idiopathic Epilepsies (CoGIE) aiming at unravelling the genetic basis and pathophysiology of idiopathic generalized epilepsy and rolandic epilepsy, the two most common idiopathic epilepsy syndromes.

D. Case Studies

The CRPs involved a wide diversity of countries in Europe and also from outside Europe. Details of the participants of the EuroEPINOMICS programme (Project Leaders, Principal Investigators and Associate Partners) can be found in the Annex.

The EuroEPINOMICS programme was launched in March 2011 and ran for three years with a total networking and dissemination budget of EUR 281,231 (managed by the ESF) and a total research budget of EUR 6.74 million managed by 13 national funding organisations: the Austrian Science Fund, Austria, Research Foundation Flanders, Belgium, the Estonian Science Foundation, Academy of Finland, Deutsche Forschungsgemeinschaft Germany, the Hungarian Scientific Research Fund, the National Research Fund, Luxembourg, the Research Council of Norway, the Ministry of Science and Higher Education Poland, the National Research Council, Romania, the Ministry of Economy and Competitiveness, Spain, the Swiss National Science Foundation, and the Scientific and Technological Research Council of Turkey.[133]

1.2 Background

Epilepsy is the most common serious neurological disorder, affecting people of all ages. As many as 6 million people in Europe and approximately 50 million worldwide suffer from epilepsy. It is characterised by recurrent seizures, which are brief episodes of involuntary movement that may involve a part of the body or the entire body and are sometimes accompanied by loss of consciousness and control of bowel or bladder function. One third of all epileptic patients remain refractory to pharmacotherapy, implying the need to develop novel treatments with innovative mechanisms of action. The discovery of the first epilepsy genes has identified novel molecular pathways involved in epileptogenesis and this has helped to define new drug targets. These findings have come mostly from rare monogenic forms of epilepsy, whereas the complex genetics of the common epilepsy syndromes and the genetic factors determining a patient's response to antiepileptic drugs (pharmacogenetics) are largely unknown.[134]

EuroEPINOMICS aimed to identify novel epilepsy genes and genetic variants predisposing to epilepsy and drug response, and to unravel their molecular pathways.

The idea of the programme came mainly from the previous experience of the EPICURE collaborative research project (funded by the EU 6th Framework Programme). The EUROCORES scheme was seen as an opportunity to get funding (that could not be obtained from alternative sources) and extend the research about some of the issues that came out from EPICURE project, making their existing collaborations more concrete/focus in terms of the research objectives.

One of the scientist interviewed added that there have always been an interest in having this kind of collaboration and that the EUROCORES scheme fitted their needs immediately. The scheme's international dimension enabled the researchers involved to reach the critical mass of patients needed to perform the analysis. Without the international dimension of the EuroEPINOMICS programme, researchers would have never been able to get the number of patients to perform any statistically meaningful analysis.

[133] http://www.esf.org/coordinating-research/eurocores/running-programmes/euroepinomics/governing-bodies/management-committee.html

[134] http://www.esf.org/coordinating-research/eurocores/running-programmes/euroepinomics.html

In the view of the Project Leader who initiated the proposal (Prof. Holger Lerche), one of the elements that distinguished EuroEPINOMICS from other initiatives is that the researchers involved designed the programme from the beginning. That is, the different CRPs of the EuroEPINOMICs programme and the way in which these CRPs would work together was a conscious design from the outset. Unfortunately, one of the CRPs initially included did not receive funding, and EPIGLIA, a project not initially included, obtained the funding instead.

According to Professor Lerche, this was a peculiar call in the sense that prospective researchers were limited in the number of partners they could choose. Most of the partners already collaborating with were in practice not eligible as they lacked national backing from their respective Member Organisations. As a result, Project Leaders were forced to find partners in other, less experienced countries with no previous links (e.g. Romania, Croatia or Estonia). On the one hand this was a time consuming exercise. Yet the researchers interviewed for this case study equally acknowledge that in the end, the new collaborations worked very well, and the new partners contributed a lot to the success of the programme. The collaboration with eastern European countries also lasted beyond EuroEPINOMICS. In contrast, a major disadvantage was the lack of involvement of several key countries, such as UK, France, Italy and the Netherlands (that instead joined as Associate Partners). A further drawback was that the funding agencies of the new partners in central and eastern Europe could contribute with comparatively less funding and also adhered to different administrative regulations.

In the view of one of the interviewees, the main reason for EuroEPINOMICS being selected in EUROCORES was that the proposals were able to successfully convince the reviewers that integration of bioinformatics and computational analysis with biomedical/medical/genetic patient analysis could be done. In fact, the interviewee believes that without the bioinformatics aspect of the EuroEPINOMICS programme it would not have been funded at all.

During the course of the programme, the collaboration between the Management Committee and the CRPs was almost non-existent. The national funding agencies were quite important for the launch of the programme, but during the course of EuroEPINOMICS they became more passive. However, the collaboration between the ESF and the CRPs was excellent. All interviewees highlighted that the ESF programme coordinator was very helpful, supportive from the start and flexible.

1.3 Activities undertaken and outputs

The Programme was launched with a kick-off meeting held in Strasbourg in September 2011.[135] The launch event allowed for the researchers to finalise details on collaborations, coordination of activities and how to approach the task of analysing patient data in one platform. In the end, the programme created a common database that continues to be used after the end of the EuroEPINOMICS programme. In addition to the programme kick-off, there were also individual CRP start-up meetings. As regards to the launch of the RES CRP, the kick-off meeting was held in Antwerp (BE) in November of 2011.

During the course of the programme numerous activities took place in different countries:

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http://www.esf.org/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/be_user/activities/EUROCORES/EuroEPINOMICS/Events/Booklet_Kickoff_without_emails.pdf&t=1435923073&hash=3af11c0c90ffda05cf2394f8cc163452d0fdc0b9

D. Case Studies

- **Workshops** on "Web Portal & Social Media" (13 March 2012, Luxembourg); "Exome data-analysis" (27-28 October 2012, Cologne, Germany); and “EuroEPINOMICS NGS analysis” (13-16 March 2014, Leuven, Belgium).
- **Short-term visits (**6 weeks) between members of the different CRPs such as: "DNA methylation analysis of CHRNA 7 in Rolandic patients using pyrosequencing" (start date 6 February 2012, Cologne, Germany) (CoGie-EpiGENet);
- **Dissemination travel grants** to support an active participation at conferences such as: "Genomic Disorders 2012 – The Genomics of Rare Diseases", March 2012, Cambridge, UK; "FENS 2012 conference", July 2012, Barcelona, Spain); "The Annual Meeting of the Society of Neurosciences**"**, October 2012, New Orleans, US); **"**Computational Biology: from genomes to cells and systems**"**, October 2012, L'Escala, Spain, Epilepsy “Genetics Workshop and Young Researchers in Epileptology Meeting” December 2013, Sde Boker, Israel, among others.
- **Meetings** "Bioinformatics Analysis Meeting" (5-6 July 2012 – Luxembourg) and meeting of the EuroEPINOMICS Consortium (30 October-1 November 2013 Tübingen, Germany).

A final conference, which was attended by more than 70 scientists, was held in Helsinki, Finland in April 2014. The four CRPs reported on their activities and shared scientific results within the programme. They also discussed and planned future research projects and collaborations with unspent networking and dissemination funds. As a result, two additional activities took place:

- **Training Programme & Specialised Course**: recruitment of familial epilepsies in Israel/Palestine, 23 April - 31 December 2014,
- **Symposia on Epigenetic mechanisms in epileptogenesis** (Sölden, AT), 6-11 April 2015.

EuroEPINOMICS aimed to bring together scientific expertise and resources of leading European research groups in order to provide high-resolution maps of genetic risk factors for common epilepsy syndromes, dissect genetic determinants of the response to antiepileptic drugs, and elucidate the mechanisms of epileptogenesis. The molecular genetic studies focused on common idiopathic epilepsy syndromes, mesial temporal lobe epilepsy, febrile seizures, and rare monogenic epilepsy syndromes.

At the programme level, the collaboration between the CRPs was sufficient to achieve the programme aims. Yet, not all CRPs cooperated in the same manner. The collaboration between the RES and CoGIE CRPs was excellent, according to their respective Project Leaders and the Review Panel. The collaboration was very productive and is still on-going after the programme has ended. The researchers have initiated further international collaborations and have received international recognition. The RES and CoGIE CRPs collaboration with EpiGENet was also quite good. There were numerous interactive/join conferences, workshops and meetings between these CRPs.

However, the integration between EPIGLIA CRP and the other three CRPs did not work as expected. Similarly, at the EPIGLIA CRP level, the partnership between some of the organisations worked better than with others. According to EPIGLIA Project Leader, there was an excellent collaboration between Bonn and Utrecht which has led to further cooperation.

EuroEPINOMICS participants point out that it should nevertheless be kept in mind that the EuroEPINOMICS programme initially was a call for different projects around epilepsy. Selected

projects then tried to form a coherent programme. Different levels of collaboration between entities were therefore to be expected.

The EuroEPINOMICS programme achievements were very impressive. In fact, one of the Project Leaders interviewed noted that EuroEPINOMICS was the most successful project he has ever been involved in, in terms of outputs. The success of the programme was also stressed by the Review Panel who noted a "very good overall performance of the programme with achievements that go beyond the initial goals". The researchers published a notable number of papers in highly ranked journals such as Nature Genetics, PNAS, and the American Journal of Human Genetics, which is the second most important journal in genetics. A good number of additional articles are still under development and there are hopes that these will be published in the near future. In addition, a huge amount of genomic data and tools have been produced during the programme period, which will probably encourage further research.

A blog on epilepsy genetics (Beyond the Ion Channel)[136], discussing the recent findings in epilepsy genetics, was also created under the programme with the aim of making the research more accessible. This blog is considered to be best practice and has become recognised internationally. Since the end of the programme it has become the official blog of the Genetics Commission of the International League Against Epilepsy (ILAE).[137]

Moreover, the RES project established the VARBANK platform with rare sequencing data, and a web based platform, known as BENCH. The EpiGENet project established a database of promotor methylation of the human epileptic hippocampi. The scientific highlights of the CRPs are summarised in the table below:[138]

CRP	Aims	Scientific highlights
CoGIE	Unravelling the genetic basis and pathophysiology of idiopathic generalized epilepsy and rolandic epilepsy, the two most common idiopathic epilepsy syndromes.	Whole exome sequencing of 1-2 affected individuals of 243 independent families and whole genome sequencing of 15 whole families concerning IGE. In addition, sequenced the exomes of affected individuals of 250 families with RE and associated phenotypes, and whole genomes of all individuals in 5 families. The first breakthrough in the etiology of common complex genetic epilepsy syndromes was achieved in a large cross-CRP collaboration. In addition in terms of clinical practice, RES and CoGIE published the first next generation sequencing approach for diagnostic purposes in the epilepsies. A panel of >300 genes associated with epilepsy was sequenced in parallel, in this first approach in 33 patients with suspected but unclear genetic causes of epilepsy. This has led to the evaluation of data of >1,000 diagnostic panels of people with epilepsy from Europe.
RES	Decipher the genetic basis of many rare epilepsy syndromes with emphasis on epileptic encephalopathies.	Whole exomes/genomes of patients with severe epileptic syndromes were sequenced. A platform was developed to share variants and mutations found in these cohorts with the other CRPs, mainly with the CoGIE-CRP that looks at the genetics of common epilepsy syndromes.

[136] http://epilepsygenetics.net/
[137] http://www.ilae.org/
[138] http://www.esf.org/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/be_user/activities/EUROCORES/EuroEPINOMICS/FINAL_EPI_consensus_statement.pdf&t=1436210980&hash=591d6eaf0e98874ff665da598c78197eeed2046b

D. Case Studies

CRP	Aims	Scientific highlights
EPIGLIA	Unravelling the genetic and molecular pathways of temporal lobe epilepsy and febrile seizures.	Established new animal models in Oslo and Utrecht: 1) the intracortical kainate injection model in mice and 2) the febrile seizure mouse model (hyperthermia induced by warm air), established at Bonn University.
EpiGENet	Characterize common epigenetic pathomechanisms of epileptogenesis by utilizing both animal models and specimens from human brain.	It contributed to the design of two successful EU Framework Programme 7 projects entitled EPITARGET and DESIRE. These FP7 consortia have their central idea in the concept of combinatorial approaches to the treatment of epilepsy, recognising the complexity that EpiGENet was central to revealing.

Source: adapted from the Review Panel Final Consensus Statement

While at the programme level, EuroEPINOMICS was very productive in terms of producing scientific outputs and high-profile publications, there productivity has not been equal across the four CRPs. The EPIGLIA project was at a disadvantage as it started with one-year delay as a result of funding complications, something that negatively impacted on the CPR's productivity throughout the programme period.

Along with the scientific outputs and the blogs, dissemination of the programme findings was also done through the dissemination travel grants that supported the active participation of participants at conferences in a number of European and non-European countries.

1.4 Results and impacts

EuroEPINOMICS led to the first genome-wide association study (GWAS) in IGE which revealed significant association signals at 1q43, 2p16.1, 2q22.3 and 17q21.32. It also contributed to a worldwide collaboration including over 8,500 patients with epilepsy and over 26,000 controls to describe the first two loci with genome-wide significance across all epilepsy syndromes (at 2q24.3, implicating SCN1A, and at 4p15.1, harbouring the protocadherin gene PCDH7 not previously implicated in epilepsy).

The achievements of the programme presented in the preceding paragraph are considered very impressive for participants and the Review Panel alike. These results not only live up to initial programme objectives but also exceeded the expectations of EuroEPINOMICS participants. In the view of the participants who contributed to the evaluation, the programme made a very significant contribution to scientific knowledge. One of the Project Leaders stated that the main impact of the programme was the creation of new networks that would keep on-going beyond the funding period and involvement of the new generation of scientists in these networks. These young researchers had the opportunity to be involved in international meetings and teaching courses, and to have established personal contact with top-level specialists in the field.

The RES CRP Project Leader explained that the project wanted to establish molecular genetic of epilepsy as a research field in Europe, a goal that was ultimately achieved. The European research field is also internationally competitive and on par with US research, and there is now European-US collaboration in the field through, e.g. a EuroEPINOMICS-RES and EPI4k (US) working group which is pursuing joint research.

In terms of weaker areas of the programme, the review panel considered that the programme lacked interaction with patient organisations. It also noted that the transition from 'bench to bedside' leading to potential new therapies have been limited, although the panel equally recognised that this was probably too ambitious for a three-year research programme.

One interviewee (Project Leader) stressed that the interdisciplinary research was *the* added value of the programme. EuroEPINOMICS has been visible at international level and well known to other consortia inside and outside Europe. It would not have been possible to achieve the programme outputs without the international dimension of the scheme, as it would simply not have been possible to achieve the critical mass needed to undertake the research. Another Project Leader commented that the EUROCORES scheme differed from other European wide projects, as the cooperation was overall better than under other comparable instruments. EUROCORES participation was also seen as a general advantage when pursuing funding in the future, as the scheme is reputable and considered to support high-quality research in Europe.

Participants also recognised there was an unexpected advantage of participating in EUROCORES as EuroEPINOMICS (inadvertently) created new valuable collaborations with smaller research countries in central and eastern Europe. This benefit was also considered to be less likely to have occurred under another instrument, such as the Framework Programme, as the latter requires very strong track records to be competitive.

1.5 Challenges to the projects and how these were met

The main challenge to the programme was the Associated Partner status of major research countries like the UK, France and Italy. Their exclusion from the core of the programme had an overall negative impact on the programme overall. As compensation, smaller research countries, including Estonia and Lithuania, were able to step up and increase their research capacity, drawing benefits from a newly established collaboration.

A second issue raised during the interview programme was the lack of commitment in a small number of organisations that participated in EuroEPINOMICS, and which ultimately resulted in 'uneven' collaboration within the programme.

1.6 Conclusions

Overall, it can be concluded that EuroEPINOMICS was very successful in achieving its main goal which was to promote collaborative research in epilepsy in Europe with a focus on basic research on genetics and pathophysiology of rare and common epilepsy syndromes. Interdisciplinary and international research activities were major features of EuroEPINOMICs and key added values of the programme. Thanks to the international dimension of the programme, it was possible to reach a critical mass of patients needed to undertake the research and make a statistically relevant analysis. The review panel noted a very good overall performance of the programme with achievements and scientific outputs that go beyond the initial goals. A wide range of activities took place under the programme and a large number of papers in prestigious and high-profile journals were published.

As regards the main impacts of the programme, all participants stressed that this was the creation of new long-term networks across Europe and the involvement of the new generation of scientists in these networks.

D. Case Studies

Annex

The table below summarises the Principal Investigators (PIs) and Associate Partners (APs) of the Programme[139]:

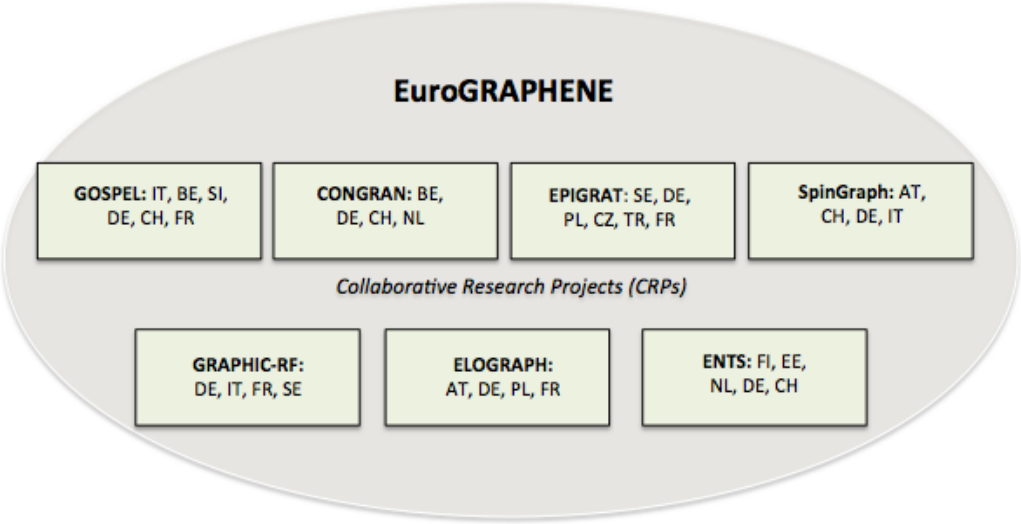
CRP Acronym	PLs (Country)	PIs (Country)	APs (Country)
RES	Prof. Peter De Jonghe (BE)	Prof. S. Hande Çağlayan (TR) Prof. Dana Craiu (RO) Prof. Ingo Helbig (DE) Dr. Dorota Hoffman-Zacharska (PL) Dr. Johannes Lemke (CH) Prof. Felix Rosenow (DE) Dr. Kaja Kristine Selmer (NO) Prof. José Serratosa (ES) Prof. Tiina Talvik (EE)	Prof. Nina Barisic (HR) Prof. Helle Hjalgrim (DK) Prof. Niels Tommerup (DK) Prof. Holger Lerche (DE) Dr. Heather Mefford (US) Prof. Aarno Palotie (FI)
Epiglia	Prof. Erik Taubøll (NO)	Prof. Reetta Kälviäinen (FI) Prof. Christian Steinhäuser (DE)	Dr Pierre N.E. de Graan (NL)
EpiGENet	Prof. Asla Pitkänen (FI)	Prof. Albert Becker (DE) Prof. Ingmar Blümcke (DE) Dr Katarzyna Lukasiuk (PL) Dr Thomas Sander (DE) Prof. Günther Sperk (AT)	Dr Christophe Bernard (FR) Associate Prof. Assam El-Osta (AU) Prof. Sanjay Sisodiya (UK)
CoGIE	Prof. Holger Lerche (DE)	Prof. Rudi Balling (LU) Prof. Anna-Elina Lehesjoki (FI) Dr Zsofia Magloczky (HU) Prof. Bernd Neubauer (DE) Prof. Peter Nürnberg (DE) Prof. Fritz Zimprich (AT)	Dr. Bobby Koeleman (NL) Prof. Dimitri Kullmann / Dr Stephanie Schorge (UK) Dr. Massimo Mantegazza (FR) Prof. Aarno Palotie (FI) Prof. Steven Petrou (AU) Dr. Thomas Sander (DE) Dr. Federico Zara (IT)

[139] http://www.esf.org/coordinating-research/eurocores/running-programmes/euroepinomics/projects-crps.html

D. Case Studies

Case Study 5: Maximizing the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE)

"The EuroGRAPHENE programme provided a framework for bringing together the complementary expertise of technologists, experimentalist and theorists within small and medium-size consortia of world-leading European research groups, in order to accelerate the pace of European research in graphene and its applications by concentrating and networking the activities."[140]



1.1 Overview

The EUROCORES EuroGRAPHENE Programme, which ran between 2011 and 2014, was funded as there was a perceived need for European-wide cooperation to deepen the understanding of the physical properties of graphene. EuroGRAPHENE was probably the first big European project in the area of graphene and wanted to lay a scientific foundation so that research could be expended into new areas of chemical modifications of the material. The programme i) searched for methods to design it electronic properties; ii) investigated its mechanical and electro-mechanical properties, aiming at understanding optoelectronic effects; and iii) modelled graphene-based devices for any functional applications.

These objectives were laid out through seven Collaborative Research Projects (CRPs), which included 43 principal investigators as well as associated partners. The CRPs covered most of the current developments in the field: fabrication and characterisation, including epitaxially grown graphene, nanoribbons, nanostructures, and interfaces with metals), electrical and optical measurements, and theoretical modelling.

[140] Maximizing the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE): Background and Objectives. See http://www.esf.org/index.php?id=5452

D. Case Studies

Table 1 EuroGRAPHENE Collaborative Research Projects

GOSPEL	Graphene-Organic SuPramolEcular functionaL composites
CONGRAN	Confinement in Graphene Nanostructures
EPIGRAT	Epitaxial Graphene Transistor
SpinGraph	Graphene-based systems for spintronics: Magnetic interactions at the graphene/3d metal interface
GRAPHIC-RF	Graphene on SiC wafers for high performant RF transistors
ELOGRAPH	Electrical and Optoelectronic Graphene Devices
ENTS	ENTangled spin pairs in graphene

EuroGRAPHENE was funded by 14 European funding agencies – Fonds zur Förderung der Wissenschaftlichen Forschung in Austria, Fonds National de la Recherche Scientifique in Belgium, the Czech Science Foundation, the Estonian Research Council, the Academy of Finland, Deutsche Forschungsgemeinschaft in Germany, Consiglio Nazionale delle Ricerche in Italy, the Dutch Foundation for Fundamental Research on Matter, the Ministry of Science and Higher Education in Poland, the Slovak Research and Development Agency, the Slovenian Research Agency, Vetenskapsrådet in Sweden, the Swiss National Science Foundation, and the Scientific and Technical Research Council of Turkey.

1.2 Background

Graphene is a form of carbon consisting of planar sheets that are a mere one atom thick. Graphene is the first of a large family of monoatomic, two-dimensional materials. Graphene is a gapless semiconductor with unique electronic properties.[141] It is also:

- Ultra-light yet immensely strong;
- 200 times stronger than steel, but incredibly flexible;
- The thinnest material possible as well as being transparent;
- A superb conductor and can act as a perfect barrier (it is impermeable to all gases and liquids).

Graphene has been the subject of research since the mid 1940s. Yet a method to prepare the single atomic layer of carbon and to investigate its unique properties were first discovered by Geim and Novoselov in the mid-2000s at the University of Manchester – a discovery which led to the Nobel Prize in Physics 2010. Consequently, international interest in graphene research rose significantly, with countries such as South Korea or Singapore developing strong research activities in the field, both in academic and industrial laboratories.[142]

Graphene's physical properties have also raised expectations that this ultrathin carbon layer can be used and commercialised in a range of electronic devices, as well as adapted to other fields. Policymakers in Europe, the US, and Asia have expanded R&D investments in graphene, with the aim of commercialising the results. In the last decade, graphene related patenting has grown significantly, in particular since 2011. Businesses in East Asia have been strong at patenting. Some

[141] Katsnelson and Novoselov (2007) Graphene: new bridge between condensed matter physics and quantum electrodynamics
[142] Science Direct Editorial Announcement of a special virtual issue on the EuroGRAPHENE program

graphene-enabled products are now available on the market but expectations for further commercialisation are still high.[143]

The EU especially has invested a substantial amount of money in graphene research. In 2013 the Future and Emerging Technology project "Graphene Flagship" was launched with a budget of EUR 1 billion. The EU's graphene project now works to bring together academic and industrial researchers to commercialise graphene. The core consortium consists of 142 academic and industrial research groups in 23 countries.[144]

EUROCORES' EuroGRAPHENE Programme was conceived in 2008. The theme was proposed by six researchers in the field. It was led by the UK, with input from the US, the Netherlands, Switzerland, Spain and Germany.[145] EuroGRAPHENE was the first coordinated research effort at European level and it was launched just before (2009) the Manchester team received the Nobel Prize and which gave the research field a great deal of publicity and hype. EuroGRAPHENE – as a EUROCORES Programme – was more focused towards basic research and on gaining a better understanding of the fundamental properties of graphene, although some of the research was also undertaken from an applications-oriented point of view.[146]

The EuroGRAPHENE Project Leaders who have provided input to this study saw the initiative as a well-timed programme with balanced set of research topics and with great potential to develop new strands of research within the graphene field. They underline that the ESF Science Officer played a key role in putting the programme together, something which helped the timely launch the programme – just a year after the call for proposals.

With regards to the selection of projects under EuroGRAPHENE, the evaluation survey feedback indicate that "most national funding agencies decided in advance how many projects to fund, irrespective of how many projects with high evaluations include participants from their country."[147] This had some negative impacts on the EuroGRAPHENE programme composition. For example, although Switzerland had a national researcher who was part of the theme proposers, the Swiss National Science Foundation did not contribute to funding the EuroGRAPHENE, which led to the Swiss researcher to joining the programme as Associated Partner (with funds from ETZ Zurich). This was considered by the fellow researchers as a loss to the programme.[148]

1.3 Activities undertaken and outputs

EuroGRAPHENE kicked off with a meeting of all Project Leaders, Principal Investigators and Associated Partners, as well as young researchers involved in the CRPs in Strasbourg. The aim was to get all groups involved in the programme to meet and exchange information and ideas which could then help to initiate new collaborations. In addition to the actual participating researchers, the meeting was also attended by national and European Commission graphene programme

[143] Shapira et al (2015) Graphene Research and Enterprise: Mapping Innovation and Business Growth in a Strategic Emerging Technology. Nesta Working Paper No15/14
[144] See http://graphene-flagship.eu/project/Pages/About-Graphene-Flagship.aspx
[145] See http://www.esf.org/coordinating-research/eurocores/completed-programmes/eurographene/call-for-proposals/theme-proposers.html
[146] Science Direct Editorial Announcement of a special virtual issue on the EuroGRAPHENE program
[147] Survey feedback
[148] Interview feedback

representatives to gain a broader context of the research area and to draw links between EuroGRAPHENE and other on-going activities in Europe.[149]

A number of the project members knew each other from previous work. Members of the SpinGraph project team had published together previously, which was a real advantage compared to other CRPs, in particular at the start of the programme as the familiarity allowed for an effective start to the research.[150]

As the Programme brought together projects which addressed different aspects of graphene research, it was not clear to what extent the CRPs would be able to interact.[151] But overall, most CRPs turned out to be very active in cooperating through networking, training and dissemination of research results. All CRPs were effective in engaging in general graphene activities within and outside of Europe, and the Project Leaders and researchers used opportunities for initiating collaborations and discussing results.

The Review panel's final report of EuroGRAPHENE thought that generally interaction within the CRPs was good, and although the report concludes that the exchanges between different CRPs could have been stronger, it was understandable that interactions were limited as the research areas spanned quite broadly.[152]

The GOSPEL project thought the interaction helpful to the scientific research and that "*a major advantage of being part of EUROCORES comes from the networking activities, which favour the participation and the preparation of major conferences and more focussed meeting. These on one side allow us to be part of the big graphene research community, which is enlarging day after day, and on the other side allow to disseminate our results and present them in a more structured framework such as EUROGRAPHENE is, presenting them with the support and sponsorship of ESF, which is a well-known and appreciated institution in the European research area*.[153]

The CRPs also made good use of research visits as part of the programme. Several dozens of PhD students and postdoctoral researchers were involved and trained within the programme and over 40 were funded directly through EuroGRAPHENE.[154]

The programme's dissemination activities used fairly standard channels – publications in scientific journals and talks at international conferences. According to the review panel, most of the CRPs also made outreach efforts that included articles in national newspapers aimed at general audience, TV interviews and through websites.

EuroGRAPHENE organised a number of key events aimed at the research community. These included the conference Graphene Week, in 2012 and 2013, and which has now become the main

[149] EuroGRAPHENE Gospel Final report (Sections B and C)
[150] Interview feedback
[151] Maximising the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE) Review Panel Final Consensus Report
[152] Maximising the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE) Review Panel Final Consensus Report
[153] EuroGRAPHENE Gospel Final report (Sections B and C)
[154] Maximising the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE) Review Panel Final Consensus Report

annual event of graphene community in Europe. As of 2014, it is the main official conference of the European Graphene Flagship programme.[155,156]

Other key events included:

- **Graphene Workshop, from fundamental properties to applications**, Slovenia, 2013. The aim of the workshop was to attract young researchers to the field of graphene. In addition to lectures, the workshop programme included "hands-on" sessions, where participants had the opportunity to practice on real experiments.[157]

- Workshop "**Research Results Valorisation Patenting and Licensing**", Italy, 2011. The training workshop was performed in collaboration with INNOVA[@], a holding company specialised in management & innovation consulting and technology transfer and **valorisation.**

- Co-organiser of **GRAPHITA, a Multidisciplinary and Multi-sectorial European Workshop on Synthesis, Characterization and Technological Exploitation of Graphene**, Italy, 2011. The aim was to bring together scientists and engineers working on different technological applications of graphene in a multidisciplinary and multi-sectorial (academia/industry) environment, and to informally network all the participants to enhance their potential research activity on graphene. Participation of early stage researchers, PhD students and post-docs was relevant as well.[158]

1.4 Results and impacts

The investigations undertaken as part of this case study have not included an in-depth review of all seven CRPs. However, the interviews, survey feedback, and written reports all conclude that on the programme level, the EuroGRAPHENE initiative was very successful. The final report published by the review panel wrote that

"*EuroGRAPHENE has created and helped in shaping a closely collaborating community of researchers in graphene science and technology in Europe. This community has grown about ten times since the start of the programme. In this respect, EuroGRAPHENE can be considered as an enabler of the Graphene Flagship programme funded by the European Commission in 2013*.[159]

The strengthened graphene research community is partly down to collaborations between the CRPs in EuroGRAPHENE. The two CRPs addressing growth of graphene (EPIGRAT and GRAPHIC-RF) were well aligned and their collaboration continues today within the Graphene Flagship project.[160]

At a national level, EuroGRAPHENE has contributed to continued efforts by national funding agencies. For example, for the German funding agency DFG, graphene research is funded within a

[155] http://graphene-flagship.eu/
[156] Maximising the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE) Review Panel Final Consensus Report
[157] See http://www-lfos.ung.si/graphene-workshop
[158] EuroGRAPHENE Gospel Final report (Sections B and C)
[159] Maximising the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE) Review Panel Final Consensus Report
[160] Maximising the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE) Review Panel Final Consensus Report

"special priority programme" (SPP 1459) and there are today around 35-38 research groups in Germany funded through this scheme.[161]

According to our survey results[162] 88% of researchers who were involved in EuroGRAPHENE believed that the programme achieved all or most of its scientific objectives, and 93.8% that EuroGRAPHENE made significant or fairly significant contributions to scientific knowledge. In particular, the joint scientific conferences and other events were considered to be very useful, as was the training of young researchers. The ESF funding was a real bonus in this regard, as it provided travel money for exchanges and meetings. This is not the type of funding easily obtained elsewhere.[163]

Participants also admitted that the CRPs allowed for some unusual combinations and that there were wide disparities of the scientific disciplines involved in EuroGRAPHENE. Yet ultimately the combination of research topics – derived from the bottom up approach – proved constructive.

The review panellists wrote that *"In our opinion, the most important result of EuroGRAPHENE initiative was not only the large number of publications (including nine patents) obtained. The program* [sic] *has served as a model for a larger collaboration encompassing many European nations*.[164]

Although not exhaustive, our survey gives an indication of some of the outputs and outcomes of EuroGRAPHENE. Judging by the achievements in the table below, a real accomplishment of EuroGRAPHENE was the cementing of the research area on a large scale in Europe.

Output/outcome	Proportion of respondents	Output/outcome	Proportion of respondents
Peer reviewed article or book chapter	93.3%	Patent filed	13.3%
Academic prize	26.7%	Established ongoing research networks/ partnerships	60%
ERC research funding	13.3%	Established physical research facility/centre	20%
Other EU research funding	60%	Established a spin out commercial venture/activity	6.7%
National research funding	53.3%	European media coverage	20%
Other/private foundation research funding	6.7%	National media coverage	40%
Breakthrough research discovery	13.3%		

Our interview feedback also indicate the programme was effective in bringing on-board smaller countries in the research and thus helped them to expand their research competence in the area.

[161] Interview feedback
[162] In total 17 EuroGRAPHENE participants responded to our survey.
[163] Interview feedback
[164] Maximising the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE) Review Panel Final Consensus Report

As one participant put it, "EuroGRAPHENE was important for newer countries as they got into the right circles".[165]

Today the graphene field is focusing on commercialisation. At the time of EuroGRAPHENE there was only one subproject (EPIGRAT) looking at industrial application, however there is wide recognition that EuroGRAPHENE built a foundation for future commercialisation through its basic research explorations and collaboration across themes. One of survey respondents believes that EuroGRAPHENE would not have been funded by the Framework Programme as it would have been too far from industrial application. However, other EuroGRAPHENE participants disagree on this particular added value of EUROCORES as an instrument, as according to our survey just over a quarter (26.7%) believes the same achievements could have been made under another pan-European funding programme, while almost half of respondents 'don't know'.[166]

Overall, the researchers involved have been very complimentary about ESF's support for EuroGRAPHENE, suggesting that the ESF provided good top-down strategic coordination of the activities of different funding organisations.[167]

1.5 Challenges to the projects and how these were met

EuroGRAPHENE faced a number of challenges, some of which were interrelated and encountered in other EUROCORES programmes. Other challenges (such as working across research disciplines) could be considered inherent to interdisciplinary research. Feedback from Project Leaders and Principal Investigators suggest that a central funding pot via the ESF would have greatly helped alleviate the issues around participation and synchronisation.

Several CRPs commented on the limited duration of the programme. In particular, the three-year period was inconsistent with the four-year development of PhD student (a common time period in many countries).[168] Interviews with Project Leaders as part of this case study support this statement and add that the learning process of working together and co-producing scientific outputs take time – in particular as there were wide differences of scientific disciplines. As a result, most of the publications of EuroGRAPHENE were published in the last year of the programme.

There was also a lack of coordination in the start-up of the CRPs of EuroGRAPHENE. The lack of administrative synchronization was down to the national funding resources not being available to all partners at the same time. This was somewhat problematic as it made the coordination of research activities more difficult.[169]

The mobility of researchers also turned out to be an administrative challenge when one of the Project Leaders was offered a permanent position at Manchester University during the programme period. This required DFG to transfer grant money the UK, and although the Foundation was "very supportive" of the Project Leader, the delay in transferring the funding impacted substantially on the productivity of the CRP.[170]

[165] In total 17 EuroGRAPHENE participants responded to our survey.
[166] Survey feedback
[167] Interview feedback
[168] Maximising the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE) Review Panel Final Consensus Report
[169] Interview feedback and Maximising the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE) Review Panel Final Consensus Report
[170] Written feedback

The review panel report, published at the end of the programme, pointed out that the "participation as full partners of researchers from other larger European countries (France, UK, Spain) would have been beneficial for the overall programme and its impact".[171] This was also highlighted in feedback to this evaluation, with a number of Project Leaders expressing some frustration that prominent colleagues from European countries (e.g. Switzerland) not participating could not fully join the programme but were 'relegated' to Associated Partner status.

1.6 Conclusions

There is a clear consensus that the EuroGRAPHENE programme was a valuable and well-timed investment and successfully implemented despite the wide range of graphene research areas involved.

Graphene research was perhaps an obvious candidate for a European research project, considering the attention the material was receiving at the time. Using the EUROCORES programme as a vehicle for promoting graphene appears to have had a number of advantages.

Whereas funding instruments such as the EU's Framework Programme tend to look for tangible results and application, the EUROCORES scheme allowed for a pursuit of fundamental scientific knowledge to build up a foundation in graphene research.

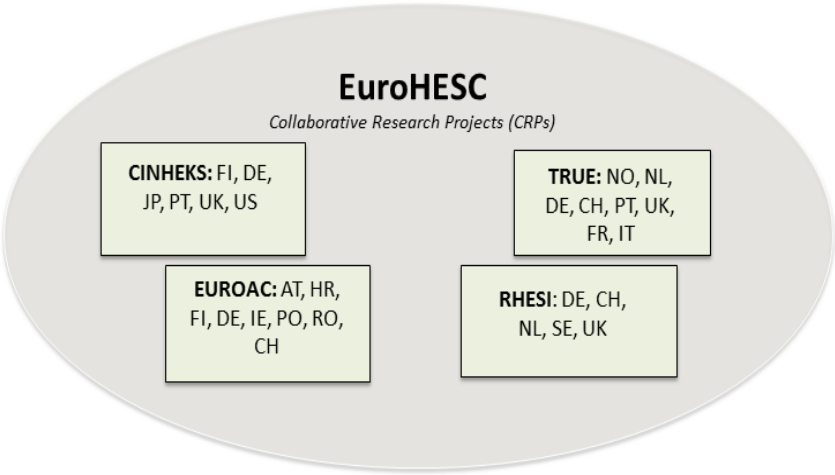
Graphene research is today the subject of substantial R&D investments. Most notably from the EU, the flagship initiative is building on of previous achievements from EuroGRAPHENE, yet equally national level research communities are able to benefit from the research built up from EUROCORES. Participants in EuroGRAPHENE have pointed out that in particular smaller countries/countries with less research capacity in graphene have benefitted from the EUROCORES collaboration. Although – as the review panel report point out – had more key countries' funding agencies felt able to participate in EuroGRAPHENE – this impact could have been applied more widely.

The flexibility of the funding under ESF rules helped to create collaboration through networking events and exchanges. In particular young researchers were able to benefit from these.

[171] Maximising the Impact of Graphene Research in Science and Innovation (EuroGRAPHENE) Review Panel Final Consensus Report

D. Case Studies

Case Study 6: Higher Education and Social Change (EuroHESC)



1.1 Overview/Executive Summary

The Higher Education and Social Change (EuroHESC) programme ran between 2009 and 2012. It was a comparatively small EUROCORES programme, formed of four CRPs. These were:

- Change in Networks, Higher Education and Knowledge Societies (*CINHEKS*);
- The Academic Profession in Europe: Responses to Societal Challenges (*EUROAC*);
- Re-structuring Higher Education and Scientific Innovation (*RHESI*):
- The Consequences of Changes in Authority Relations for the Direction and Organisation of Research: Transformation of European Universities (*TRUE*).[172]

In total, 13 countries participated in the programme across the four CPRs, namely: AT, HR, FI, DE, IE, NL, NO, PT, RO, SE, CH, UK, and the US. All of them were supported by national funding organisations, such as: Austrian Science Fund; The National Foundation of Science, Higher Education and Technological Development of the Republic of Croatia; Academy of Finland; German Research Foundation; Irish Research Council for the Humanities and Social Sciences; Netherlands Organisation for Scientific Research; Research Council of Norway; Foundation for Science and Technology, Portugal; National University Research Council, Romania; Swedish Research Council, Sweden; Swiss National Science Foundation; Economic and Social Research Council, United Kingdom; and National Science Foundation, United States.

In addition, several Associated Partners participated in the programme, representing the following organisation: The University of Tampere (FI), The University of Bath (UK), Poznan University (DE), Centre de Sociologie des Organisations (CSO) (FR), University of Manchester (UK), Hiroshima University (JP), CNR (IT).

[172] The Project Leader for the individual CRPs were: Prof. Jussi Välimaa (Institute for Educational Research, University of Jyväskylä, Finland), Prof. Ulrich Teichler (International Centre for Higher Education Research Kassel (INCHER), University of Kassel, Germany); Prof. Uwe Schimank (Institute for Sociology, University of Hagen, Germany); Prof. Ivar Bleiklie (Department of Administration and Organisation Theory, University of Bergen, Norway).

D. Case Studies

1.2 Background

The EuroHESC programme focused on the relationship between higher education (HE) and wider society. The programme stems from a relatively small field of research, which aims to observe the progressive growth of HE that has taken place during the last two decades and the implications of this growth. Specifically, EuroHESC aimed to investigate its social impacts by looking at the influence on social equity and social mobility for cohesion and integration.[173]

Two international research initiatives were key in the development of the programme. One is the Consortium of Higher Education Researchers (CHER)[174], which was founded in Kassel in 1988 with the aim to establish an international network of higher education researchers. The other initiative was the Forward Looks funded by the ESF – the *Higher Education Looking Forward* (HELF). This project ran 2006-07 with the objective of examining HE research from a wider social sciences perspective. It made use of human capital theories, theories of power, inequality and social exclusion, theories of organisations, and new public management, with the aim of addressing issues such as the changing relationship between HE and society that concerns researchers, policy makers and practitioners.[175] HELF in particular provided the research framework to the EuroHESC programme – the objective of further exploring the relationship between HE and society, underlying its institutional dimension, and improving the methodological issues of comparative research in the fields was strategically defined.

According to interviewed EuroHESC participants[176,177] both these initiative were central also to the work undertaken in EuroHESC. Being involved in the HE related research, as promoted by CHER and HELF, was considered essential to exchanging ideas and to develop further this research field. The HELF initiative consisted in a preparatory exercise that eventually provided the scientific and networking capacity to be invested in EuroHESC. The correlation between HELF and EuroHESC also involved other researchers who collaborated on the ESF Forward Looks initiative and then moved on to EuroHESC either as Project Leaders, Principal Investigators or Associated Partners.

The EuroHESC programme research covered three areas:

- The relationship between higher education and the creation and development of so-called knowledge societies;
- The relationship of higher education to processes of globalisation including migration patterns and the impact of new technologies;
- The impact on higher education and research of processes and developments in new public management, marketization and consumerism, globalisation and the changing role of the state.[178]

[173] Higher Education Looking Forward. Final Report. Downloaded at: http://www.esf.org/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/be_user/research_areas/social_sciences/Forward_Looks/Completed/Final%20report_Higher%20Education%20Looking%20Forward_2008-06.pdf&t=1435155779&hash=f2df0ca38796bdb011bae8d9e8e2e6fb1b7fe55f

[174] http://www.cher-highered.org/

[175] EuroHESC Programme: Highlights Report.

[176] Interview with Urlich Teichler – Project Leader of EUROAC (UT).

[177] Interview with Christine Musselin - Associated Partner - Science PO (CM).

[178] EuroHESC Programme (leaflet) http://www.esf.org/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/be_user/activities/EUROCORES/EUROHESC/News_and_events/EuroHESC_8p.A5_3Dec_01.pdf&t=1435146061&hash=3b2806ea221a89ec15686b2e74570fbe0847b2bf

D. Case Studies

As with all EUROCORES programmes, the selection process for EuroHESC was a two-stage process. The first was the ESF open competition requesting proposals for programme themes (2007). Secondly, a call for outline proposals (projects) was made. Twenty-one eligible outline proposals were received and the Review Panel selected nine of these (2008).

Out of the nine selected project proposals, five proposals, including a UK project, were in the end funded by the national funding agencies. Nonetheless, some of the UK researchers were able to cooperate either by supporting Principal Investigators in other EuroHESC projects, or by joining as an Associated Partner. The lack of funding commitment at national level also impacted on the proposals that had secured national funding, as they had to submit revised proposals that took into account the more limited research to be carried out without e.g. the UK researchers.

According to some interviewees, the close relationship between HELF and EuroHESC, led to issues in the selection process as the EuroHESC selection process appeared strongly influenced the countries with larger research capacity, which was a disadvantage for the smaller countries.

Other comments on the selection process indicate that it was overall an acceptable, but lengthy procedure.[179, 180]

With regard to the cooperation between the ESF and the Member Organisations during the selection process, contrasting opinions emerged from the interviews. According one of the Project Leaders, the cooperation was considered successful, and the ESF officer, who acted as a point of contact, was considered very helpful. By contrast, a representative of the German funding agency explained that ESF officers and Member Organisations faced several challenges, which negatively influenced the relationship and the management of the programme. The main difficulties were associated with complex administration requirements during the selection process. During the selection process, the most difficult moment was when funding agencies had to ratify the selected projects. If a project proposal was not ratified by all Member Organisations (because of lack of funding or disagreement on the scientific quality of the proposal), this led to delays and limited the extent to which a pan European approach was secured within each CRP.

Overall, the selection process seems to have encountered several difficulties. The benefit of having strong international academic experience in the project was on the one hand essential to the quality of EuroHESC. On the other hand, it may have hampered participation of smaller research countries.

1.3 Activities undertaken and outputs

The EuroHESC programme was launched in Brussels in October 2009. The Project Leaders presented their project designs and objectives and discussed opportunities for collaboration and cross-fertilisation across the CRPs.[181]
A key task at the start of the programme was to take a strategic decision to define the approach to the activities to be carried out as part of the research. For example, for the EUROAC project, one of the first exercises was to analyse to what extent EUROAC was different or similar from previously

[179] Interview with Urlich Teichler – Project Leader of EUROAC (UT).
[180] Interview with Stefan Koch – member of the EuroHESC management committee representing DFG (SK).
[181] In this section, it was only possible to observe and analyse programme activities at the CRPs' level. Reasons are outlined in the scientific collaboration and networking section. Due to data availability, it was only possible to look at one of the four CRPs – EUROAC.

run projects in the field of HE. Thanks to this exercise, it was possible to plan research activities using a previously run study called CAP (Changing Academic Profession) which provided a significant amount of data. These were merged with the data collected through the research activities organised by the EUROAC consortia.

One of the main research activities undertaken was a survey conducted in seven countries, not part of the consortia, with the aim to improve comparative methodology in HE research field. In addition, researchers conducted an interview programme in the countries participating in EUROAC (Austria, Croatia, Finland, Germany, Ireland, Poland, Romania and Switzerland).

Our interviews suggest that the collaboration between CRPs was rather challenging. One of the MO representatives explained that there were two levels of collaboration taking place: one the one hand collaboration within singular CRPs and on the other hand, collaboration between different CRPs within the same programme. He argues that the collaboration within a CRP was arranged and organised by the participating researchers and the resulting activities allowed the promotion of collaborative research across the countries involved. By contrast, the interviewee thinks that scientific collaboration within the programme, i.e. among different CRPs, was rather difficult to implement due to lack of capacity and funding. At the programme level, collaboration mainly coincided with conferences rather than actual conduction of basic collaborative research. The funding available did not foresee resources to support scientific collaboration at the programme level.

The same position is supported by two of our interviewees. At the start of EuroHESC, the Project Leaders did not succeed in developing an overarching framework aiming at coordinating the research across all projects. Instead, each CRP developed their individual intervention logic and strategy. In comparison with the activities undertaken with HELF, EuroHESC was considered less collaborative. There was a tendency for each CRP to focus on different research issues; thus, it was not feasible to develop a coherent and scientifically valid methodology that would have worked for all projects. This was partly due to the nature of the subject; HE is not sufficiently theory grounded, which means there is a lack of theory background on which building strong methodologies. After the definition of the four CRPs, each Project Leader found it difficult to collaborate, at least at conceptual level, whereas some activities were coordinated across the four CRPs, such as training and conferences.

With regard to the individual CRPs, according to the interviewee, EUROAC could have benefitted from a more efficient collaboration. Despite minor delays in the rolling out of activities, regular meetings were scheduled every six months. Moreover, research activities were considered collaborative within the consortia, allowing for an integrated core data collection. The EUROAC project also set realistic scientific outcomes, namely three books[182].
On the contrary, the other three CRPs required more time to be set up. With regard to the research activities, international collaboration faced several difficulties due to CRPs country composition and to the difficulty of reaching agreements on methodologies and methods to be implemented. This had a negative impact on the quality of the research and findings.

[182] Kehm, Barbara M. and Teichler, Ulrich (Eds.) The Academic Profession in Europe: New Tasks and New Challenges. Dordrecht: Springer 2013;
Teichler, Ulrich and Höhle, Ester A. (Eds.) The Work Situation of the Academic Profession in Europe: Findings of a Survey in Twelve Countries. Dordrecht: Springer 2013.
Fumasoli, Tatiana, Goastellec, Gaele and Kehm, Barbara M. (Eds.). Academic Work and Careers in Europe: Trends, Challenges, Perspectives. Cham: Springer 2015.

However, EuroHESC participants also underline that the difficulties of meeting scientific objectives are related to the challenge of conducting research in an international cooperation environment. In the field of social sciences, discussing and developing a common methodology between many different countries is quite a significant challenge. Pan-European teams involved in the different CRPs needed a lot of time to define an agreed strategy to implement the collaborative research tasks.

1.4 Challenges and opportunities of the projects

As outlined in the previous sections, EuroHESC faced a number of significant challenges. These were also identified and analysed in the programme's Review Panel Statement[183]. The review panel evaluated the programmes under three main elements, namely, scientific international collaboration, scientific outputs dissemination and programme integration. Within these, both positive and negative facts were identified.

In addition, survey results[184] suggest that the majority of respondents involved in EuroHESC provided positive feedback on the programme. By contrast, interviews with key programmes stakeholders provided more critical and negative comments, confirming the challenges to the successful roll out of the programme. Below we provide a summary of the feedback:

1.4.1 Scientific International Collaboration

Overall, stakeholders agree that EuroHESC represented a unique opportunity to carry out basic research in a pan European environment, which enabled top quality academic experts to collaborate on specific science subjects. Generally, as the survey results suggest, the majority of EuroHESC stakeholders think that the partnership originating from the EUROCORES scheme was successful in generating interdisciplinary insights and achieving scientific outcomes. Also, respondents consider collaboration among different parties positive and successful. With regard to the possibility of involving both small and big research countries in the programme, ESF played a key role in facilitating the international dimension while boosting existing collaborative scientific relationship. Stakeholders considered the correlation between HELF and EuroHESC essential. However, they also believed that such affiliation together with the scheme mechanics tended to favour the participation of the big research countries in the scheme. A few stakeholders believed that the selection of the CRPs was not fair and partial. Several respondents said that the programme did not or just partially promoted cooperation between European national funding agencies.

1.4.2 Scientific outputs dissemination

Overall, survey results indicate that the programme was successful in achieving and promoting scientific outcomes that were complying with interdisciplinary and international criteria. However, given the practical difficulties of undertaking research in an international environment and because of the time available considered too short for completing the research and accomplishing scientific outcomes, all CRPs reached this stage after the completion of the scheme. Consequently, delays were also encountered for the dissemination activities.

[183] http://www.esf.org/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/be_user/activities/EUROCORES/EUROHESC/EuroHESC_Review_Panel_statement_final5.11.12.pdf&t=1436626847&hash=84b30ebac1644bbe0154f02693f06c107c9c9d02

[184] Eurocores Scheme Evaluation Study – Online Survey results.

1.4.3 Programme Integration

Overall, the integration between the four CRPs was not considered successful in EuroHESC. Even if some coordination activities were organised, such as conferences, workshops and trainings, interviewees reported that each CRP had its own strategy and intervention logic, which did not foresee overarching research activities across CRPs. Nevertheless, according to the survey responses, the collaboration among different parties involved in the process was considered, overall good.

1.5 Results and impacts

Our research suggests that despite challenges in collaboration and in securing funding for the participating projects, the results and impacts of EuroHESC were broadly positive. However, as a result of the individual approaches taken by each CRP, it is not possible to assess impact at a programme level. According to our interviews, the lack of a coherent programme level approach, hampered at least one of EuroHESC's original aims, namely to have their work taken up at policy level.

Although it faced limitations in fully accomplishing high quality interdisciplinary research outputs, the programme helped to build a network of experts. Scientific outcomes were produced at the project level. Each EuroHESC CRP published several scientific papers, and all four were overall involved in programme's dissemination activities such as workshops, training courses and conferences.[185]One of the interviewee observed that the majority of EuroHESC research publications were still developing after the programme ended.

According to one the Associated Partner for the TRUE CRP, the scientific outputs were not considered to be of highest academic quality. Equally, some of the scientific papers published through EUROCORES could have been produced without being sponsored by the collaborative research initiatives, which suggests that they had a low added value. The added value instead manifested itself at a policy level. Thanks to EuroHESC, the national funding agencies involved had the opportunity to build a relationship that allowed them working beyond the scheme, in initiatives such as ERA-NET.

In the case of the EUROAC project, research activities and networks enabled through EuroHESC will continue to operate beyond the funding period and some of the actors involved are already planning for a questionnaire (survey) to be distributed in 2017 as part of a new project for academic profession. This can be considered a spin-off of the EUROCORES funded activities.

1.6 Conclusions

Overall, it can be argued that the programme made a strategic impact since it allowed building an international partnership, which is now working together in other activities such as ERA-NET. The importance and scientific benefit of financially supporting social sciences and humanities at international level is recognised by all interviewees. In the HE field, specifically, the opportunity of conducting cross-border research is highly valuable because it allows achieving further

[185] EuroHESC Programme: Highlights Report. Downloaded at: http://www.esf.org/fileadmin/Public_documents/Publications/eurohesc_highlights_04.pdf

developments in comparative analysis methodologies. However, international collaboration projects should be strategically planned to ensure good coordination.

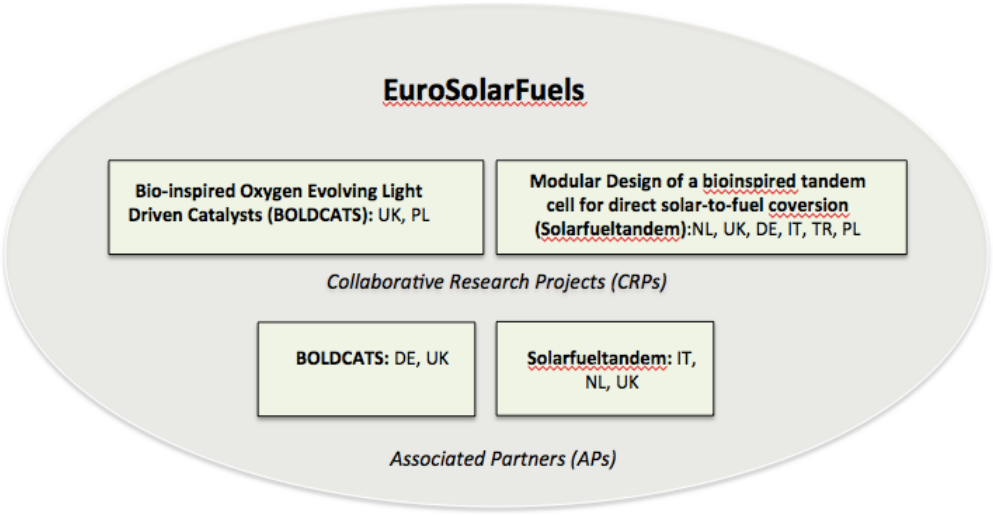
Future international collaborative research schemes can take EUROCORES as a significant example. During the interviews, multiple recommendations for the future were suggested. One of the Project Leaders stated that in future similar research initiative practitioners should aim to encourage further political engagement from wider stakeholders such as policy makers, the general public, industry etc.

In the future, the coordination role, in this case played by ESF, should foresee procedures to secure sharing data mechanisms among different CRPs since the lack of collaboration on data sources resulted to be a negative aspect of the programme, damaging relationship and trust between organisations.

Lesson learned during the EuroHESC programme helped participants to improve their practices and processes. For example, the importance of developing a common methodology has become more apparent. In programmes like EuroHESC, it is not sufficient to 'merely' share knowledge.

D. Case Studies

Case study 7: Molecular Science for a Conceptual Transition from Fossil to Solar Fuels (EuroSolarFuels)



1.1 Overview/Executive Summary

EuroSolarFuels was a relatively small EUROCORES programme running from 2011 until 2014 with two CRPs:

- *Bio-inspired Oxygen Evolving Light Driven Catalysts* (BOLDCATS). It was led by Professor Richard Cogdell (UK) and one Principle Investigator from Poland. In addition to that, there were two Associated Partners from Germany and the UK involved;
- *Modular Design of a bioinspired tandem cell for direct solar-to-fuel conversion* (Solarfueltandem), which was led by Professor Huub De Groot (NL). Eight principle investigators were involved in this CRP from the following countries: NL, UK, DE, IT, TR and PL. Additionally, there were three Associated Partners from IT, NL and UK.[186]

In total six funding agencies supported the EuroSolarFuels programme: Max-Planck-Institut für Bioorganische Chemie, Germany; National Research Council, Italy; Ministry of Science and Higher Education, Poland; Netherlands Organisation for Scientific Research; The Scientific and Technological Research Council of Turkey; and the Biotechnology and Biological Sciences Research Council, UK.

1.2 Background

European countries depend heavily on traditional energy resources such as oil and gas. These resources are at risk due to the various factors such as scarcity, geographical, and political factors. The decline in availability of traditional energy sources impacts not only the economy but also the everyday life of citizens in Europe. Furthermore, fossil fuels do not only pose a risk due to severe availability constraints but also pollution problems and fast growing CO2 emissions which accelerate global warming. Furthermore, many citizens worry about large, future nuclear-power programmes and their associated environmental and potential heath hazards.

The energy and research sectors felt that there was a strong need for large-scale development and investments of sustainable energy research (i.e. solar energy). The term 'solar fuels' is developing

[186] Further details can be retrieved from: http://www.esf.org/coordinating-research/eurocores/running-programmes/eurosolarfuels.html

into a buzzword since the beginning of the new millennium. Environmentally friendly fuel production is considered to be of strategic importance for both medium and long-term research. This coincides with the goals of the research in the EuroSolarFuels programme. The EuroSolarFuels programme worked to accelerate the research on solar fuels on a pan-European scale. By doing so it integrated science from many fields and employd a targeted multidisciplinary approach in chemistry, physics and biology.[187]

One of the Project Leaders stated that the main importance of EuroSolarFuels is that it addressed the problem of how to store energy from the sun. In 2004 there was a breakthrough in protein structures which gave impetus to the programme at hand. Other EuroSolarFuels participants also mentioned that the main reason of why EuroSolarFuels was selected was because of its relevance for humans and the environment as a whole.

At the time of the call for theme (the initial call from ESF) individual researchers had already approached national research agencies to discuss potential research before applying to ESF. One of the EuroSolarFuels Project Leader's believes this move was crucial – in particular after the economic crisis in 2008 – since it gave the funding agencies a better opportunity to consider funding (and discuss directly with the researchers) before having to commit.

According to an interview conducted with one of the Project Leaders, in principle the selection process was efficient but had two deficiencies. First, the existence of the two-stage process was considered to be flawed since a programme is accepted at ESF level, but individual project funding is not confirmed at Member Organisation level. This means that Member Organisations could in practice 'obstruct' a whole programme if declining to fund individual projects. For instance a Hungarian project was not approved, which impacted on EuroSolarFuels as a whole. Our interviewee expressed understanding for the ESF in asking individual funding agencies to fund the best projects selected, however also commented to say that "it is naïve to think that top-level research always gets national funding".

Although the majority of interviewees viewed the Peer Review Panel as "rigorous and competitive", the "generic knowledge" of the panel was the root of another challenge, according to one Project Leader, who believes the Panel would have benefited from additional expertise in some niche areas.

On the level of cooperation between the Project Leaders and the Management Committee, overall the feedback was very positive. All interviewees agreed that the joint meetings were very helpful and effective.

1.3 Activities undertaken and outputs

The EuroSolarFuels programme took some time to commence. Although there was an official starting date, every national funding agency provided the money at a different stage. This led to delays in the start and variations in the progress made at national level. Although an informal kick-off meeting was organised, the first official meeting was held only after one and a half years (mid-term), but also included external international participants.

The CRPs divided the work between the different project members. For instance, catalysts work was done in Germany and full flesh quantum theory was developed in the Netherlands. Collaboration

[187] "EuroSolarFuels Molecular Science for a Conceptual Transition from Fossil to Solar Fuels" Retrieved from: http://www.esf.org/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/be_user/activities/EUROCORES/EuroSolarFuels/Documents/EUROCORES_EuroSolarFuels_Dec.2013.pdf&t=1433594890&hash=1482c6f4b2b99e8c985fa9e4bebdc2eda47156d1

was essential and the division of labour worked well.[188] Young researchers undertook a great deal of intellectually challenging work, which proved an effective approach. In Poland three young university researchers were funded, and one of those three initiated a permanent research unit at the university.[189]

According to one Project Leader, the coordination among the different teams and the networking was very straightforward, and staff among the different universities was very mobile. Many, but not all participants of the EuroSolarFuels programme knew each other already before the programme started, which facilitated cooperation enormously. In cases where 'new researchers' joined, additional networks were created.

The interviewees perceived the role of the ESF officer as very positive in facilitating communication between the different researchers, in negotiating with Member Organisations, in monitoring progress, and in coordinating meetings. The flat hierarchies were regarded as another asset of the programme. Some interviewees noted that other funding instruments require much stricter means of communication among researchers.

According to our interviews, the BOLDCATS CRP only achieved 60% of its objectives. The Project Leader maintained that this was a decent result for a project addressing fundamental problems. The initial objectives of BOLDCATS were quite ambitious. The researchers also faced some technical challenges that were not possible to address within the three-year timeframe of the programme. The EuroSolarFuels Review Panel also faced some challenge sin trying to assess the achievements of BOLDCATS, as some outputs did not (fully) include acknowledgements to EuroSolarFuels.

As reported by the Solarfueltandem Project Leader, the outputs of this project were perceived as fully satisfactory. He argued that the research is currently setting the trend for the international research community in the solar fuel field.

Dissemination of the research activities took a different form in different countries. In the Netherlands, Germany, the UK, and Hungary there was even a presentation on national TV. But in every country the wider academic reach was more relevant and it was noted in an interview that academic dissemination started during the programme. For instance, at the mid-term meeting in Glasgow, EuroSolarFuels invited members of the global research community. Furthermore, some researchers participated in the European Research Alliance for a low-carbon Europe[190]. In Poland the researchers participated in a science festival, which led to some media attention. Furthermore, a course was created at university to teach the results of the programme to other researchers. In terms of industrial outreach, there was a lot interest from industry. However, cooperation with industry was at a rudimentary level. One interviewee mentioned that cooperation with industry is very important and needed to be improved.

1.4 Results and impacts

Both Project Leaders regarded the scientific results and project outputs to be identical to the key results of the programme. When discussing the overall impact of the Programme both interviewees mentioned that the focus of the research was on a very fundamental aspect of the subject matter. Therefore it was more about detecting and defining technical problems instead of developing 'new research'. The real impact of the programme will only be measurable in 5-10 years time. Currently, impact is mostly confined to the scientific community. Through publications in scientific journals the

[188] Project Leader Solarfueltandem
[189] ibid.
[190] http://www.eera-set.eu/

Project Leaders believe that an important foundation for further research has been laid and that some of the scientific articles published have high citation rates.

Industrial impact is also expected to grow. Thanks to Solarfueltandem research, national R&D programmes have been established which bring science and industry together.[191] With regards to the BOLDCATS project, the research has had some impact on policy, as the research results is an important evidence-base for policymaking in the area of renewable energies.

With respect to the promotion of collaborative research in Europe both project leaders evaluated the results as excellent. The programme supported research mobility, especially among young researchers. The BOLDCAT project team is working to continue their collaboration and are applying for funding under an EU programme.

Ultimately, the main advantage of the programme was that EUROCORES allowed for a science driven approach, which enabled the researchers to address scientific questions that do not immediately lead to an industrial application. Both Project Leaders stressed the need for this type of support.

1.5 Challenges to the projects and how these were met

The Review Panels of both BOLDCATS and Solarfueltandem recommended that the ESF grant a non-cost extension to allow for the research to complete as the research was behind schedule at the mid-term reporting stage.

Although the Review Panel indicated that the collaboration within the programme could be further improved, all interviewees have positive views on the level of cooperation.

The Project Leaders indicated instead that the key challenges were related to funding and the selection procedure. There was a delay in starting the research due to the late arrival of funding and valuable partners were in practice excluded due to lack of national funding.

Both CRPs also believed that although the interdisciplinary approach of the programme was of great value, it was also a challenge, particularly for younger researchers. It was mentioned that it is difficult to find a solution to certain problems since every discipline has different ways to address them. An attempt to tackle this problem was made only towards the middle of the programme. The researchers could have benefited from assistance from the ESF to help foresee and tackle these kinds of issues.

1.6. Conclusions

It can be concluded that EuroSolarFuels was overall a successful programme dealing with fundamental questions on how to solve the current energy crisis. EuroSolarFuels addressed the problem of how to store energy from the sun. Although the programme addressed research of fundamental importance for the environment and society as a whole, another reason for the successful application of the project was the efforts of the Project Leaders to open a discussion with national agencies right from the beginning. This appears to have helped raise the profile of the research at the proposal stage.

The overall feedback and comments in the interview process indicate that communication between the different participating researchers was excellent. Particularly the young researchers were able to participate thanks to the flat hierarchies and the support of the ESF coordinator. Furthermore, researchers in the programme also established relationships that have lasted beyond the funding

[191] In the Netherlands: http://www.biosolarcells.nl/ In Germany: http://www.acatech.de/

period. All interviewees mentioned that they are either in the process of applying for new funding with the same researchers or are already working with them on follow-up programmes.

In addition, both Project Leaders valued the investigator-driven nature of the EUROCORES programme which they regard rarely to be the case for research funding schemes. Both PLs argued that tackling fundamental problems is not directly relevant for industry but provides the foundation for any applied science and further research. In this regard all interviewees regret the closure of EUROCORES.

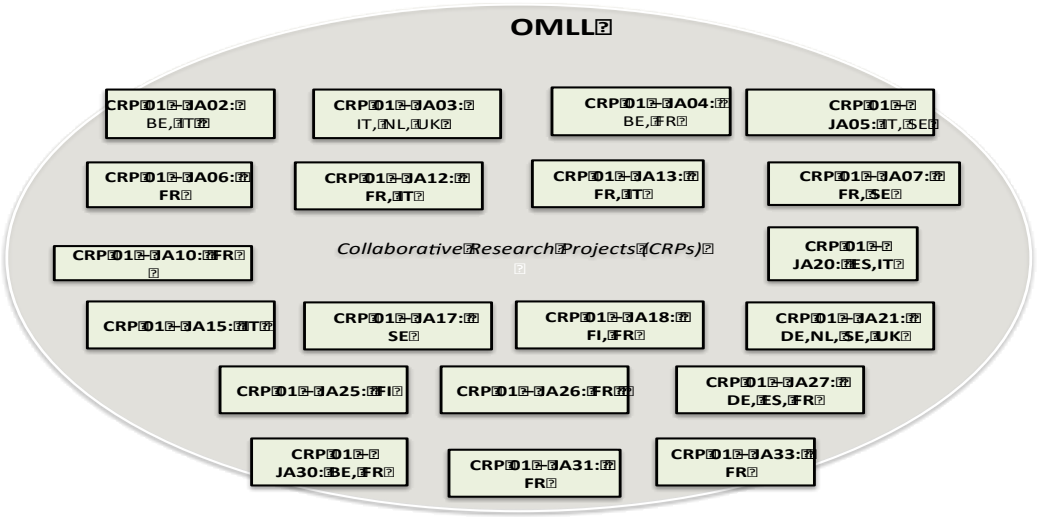
Interdisciplinarity was regarded as very important for the research as such but particularly younger researchers also saw it as a challenge since solutions to various problems are different depending on the discipline. One way to approach this challenge is to offer training for young researchers at the beginning of a programme.

Nevertheless, the Project Leaders did not find interdisciplinarity to be a problem due to their long experience. Furthermore, they argued that it is important to expose young researchers right to the start with other ways to solve problems. Additionally, the Project Leaders mentioned that while interdisciplinarity is always considered to be important EUROCORES is one of the few funding schemes that adhere to this virtue.

Funding – and delays in funding – caused some problems during the programme period. An initial problem was that a research team from Hungary was not able to participate in the programme since the national funding agency rejected its application (even though it was recommended for funding by the EUROCORES Peer Review Panel). As a result, the BOLDCATS project was a much smaller CPR than Solarfueltandem,

D. Case Studies

Case Study 8: The Origin of Man, Language and Languages (OMLL)



1.1 Overview

The Origin of Man, Language and Languages (OMLL), was the first EUROCORES programme to be launched. OMLL was wide in scope with a multidisciplinary approach, running from 2003 until 2007. The OMLL programme consisted of six main research topics through 20 CRPs:

Research topics
Language and archaeology
• Comparison between the complexity of communication systems and cognitive complexity inferred from archaeological findings • Comparison between linguistic and archaeological data for periods between 15,000 and 5,000 BP (especially in the Indo-European domain) • Evaluation of Neanderthal communication systems and cognitive abilities
Language and Brain
• Evolution of cortical regions involved in language production and perception • Study of the neurophysiology of mimesis and its role in the emergence of language faculty
Language and Genes
Language acquisition and language universal
• Comparison between processes involved in language acquisition vs. language emergence/evolution • Language universals and brain architecture (and processes)
Language and animal communication
Language evolution and computer modelling
• Social impetus for the emergence of language • Use of self organisation concepts in the study of language evolution • Polygenesis vs. monogenesis of language origin • Evaluation of population size between 100.000 years ad 10.000 years ago

The main goal of the OMLL programme was to investigate the origin and evolution of human language with an emphasis on the question of the co-evolution of modern humans and language. In particular the programme focused on three main themes (i) the evolution of anatomically modern

humans; (ii) language development; (iii) linguistic diversity.[192] OMLL had a budget of EUR 6 million. In total 12 funding organisations supported the OMLL programme: Fonds voor Wetenschappelijk Onderzoek, Belgium; Fonds National de la Recherche Scientifique, Belguim; Statens Humanistiske Forskningsråd, Denmark; Academy of Finland/Research Council for Culture and Social Sciences, Finland; Centre National de la Recherche Scientifique Centre de Recherches Linguistiques, France; Deutsche Forschungsgemeinschaft Bonn, Germany; Consiglio Nazionale delle Ricerche, Italy; NWO, the Netherlands; Fundacao para a Ciencia e Tecnologia, Portugal; Comisión Interministerial de Ciencia y Tecnología, Spain; Swedish Research Council; and the Arts and Humanities Research Council, UK.

1.2 Background

Consiered an unsolvable problems for a long time, the study of the origin of language and of languages is more recently emerging as a promising field for multi-disciplinary research, where prehistoric archaeology, palaeo-anthropology, genetics, linguistics, neurophysiology, cognitive sciences, as well computer science and robotics, can profitably collaborate, and where international collaboration may bring specific additional benefits. The development of linguistic and cognitive skills in the prehistoric past can be studied nowadays with reasonable expectations of success thanks to the converging developments of several disciplines. New perspectives were opened by genetics, but also evolutionary anthropology, neurophysiology, and cognitive sciences seem to converge on offering a solid ground for a fresh approach to the old problem of the origin of language(s). Recent pioneering research has comparative maps of genetic and linguistic human families that show similarities between the distribution of genetic diversities and that of linguistic groups. Similarly, the development of linguistic skills is to be linked to the evolution of the brain and of its cognitive strategies.[193]

The OMLL programme was seen as a great opportunity on a European level in the field of humanities in general and linguistics. The programme built on previous research, including research funded by the CNRS in France. In addition to the scientific relevance of the research, the research areas covered by OMLL thought to be underrepresented in EU research programmes generally.[194]

According to our survey of EUROCORES, most OMLL participants thought that there was, to an extent, a fair and impartial process in CRP selection as well as good administrative and scientific coordination. The final evaluation report of the review panel considered the main weakness of the OMLL programme to be the funding mechanism; one Project leader mentioned that their project had to be reviewed and evaluated not only at a European level but on a national level as well. At a European level the evaluation was excellent but that on a national level was very poor and that at the end they have received half the amount of the fund because the money eventually came from the national authority and not from a European level.

1.3 Activities undertaken and outputs

The first OMLL conference was held in April 2004 at the Max Planck Institute for Evolutionary Anthropology in Germany. Presentations addressed the evolution of language and the diversity of

[192] For details on CRPs please see http://www.esf.org/coordinating-research/eurocores/completed-programmes/omll/projects/list-of-projects.html#c15613

[193] OMLL Background. See http://www.esf.org/coordinating-research/eurocores/completed-programmes/omll/background.html

[194] Views of a Project Leader during an interview

languages from a variety of fields, such as archaeology, linguistics, genetics palaeo-anthropology, computer science, neuroscience and psychology. All the 20 CRPs participated with 200 scientists presenting latest research results.

According to our survey, most OMLL participants' responses on the collaboration between partners ranged from excellent to good, although a minority indicated collaboration was a challenge. However, most respondents also said that the OMLL collaboration continued after the programme ended. For example, one participant mentioned that the programme provided the opportunity to meet and interact with other CRPs working in close subjects; for example she mentioned that their team have made connections and planned future collaborations with other European teams participating in this programme.

The OMLL programme held a number of workshops and virtual workshops, such as: "Evolving communication: from action to language. An "implicit vs. explicit" cognitive and pragmatic perspective (2004 Italy); "What Do Mirror Neurons Mean? Theoretical Implications of the Discovery of Mirror Neurons (2004 France); "Early Word Segmentation: a Cross-Linguistic Approach Taking Advantage of Europe's Linguistic Diversity (2005 France); "Phylogeny and Ontogeny of Human Communication (2005 Italy); Languages and genes: recent work and emerging results (2005 France); Exploring the potential of Eco-cultural Niche Modelling for reconstructing the geography of past human populations (2005 France); Language and Genes in East Asia/Pacific (2006 Sweden); "VOCOID" Vocalisation, Communication, Imitation and Deixis in infant and adult human and non-human primates (2007 France); "Human Language Dynamics" at the "International School on Semiotic Dynamics, Language and Complexity" (2007 Italy); Migration (2007 France).

In 2008 two dissemination activities took place in France the New Directions in Historical Linguistic" and the "Us and Them: Modelling past genetic, linguistic, and cultural boundaries". According to the review panel final evaluation report, the OMLL programme frequently invited external experts to OMLL activities, which proved beneficial; both for creating the new contacts, as well as for the dissemination of the OMLL work outside the OMLL framework.[195]

A final conference was held in Rome in 2007 and brought together research projects from archaeology, (paleo-) anthropology, artificial intelligence, ethology, genetics, linguistics and neuroscience offering an overview of what had been achieved through the programme.

1.4 Results and impacts

OMLL participants who responded to our survey agreed that most of the scientific objectives were achieved and that overall the programme made a very significant contribution to scientific knowledge. However the level of achievement varied across disciplines.

As shown in details in the table below, the CRPs under the OMLL programme opened up new research opportunities and facilities, which resulted in various significant scientific outputs and helped to define new questions for future research. The programme established itself as a world-leader in the area of interdisciplinary research relating to the linguistics, genetics, archaeology, anthropology etc.

[195] http://www.esf.org/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/be_user/activities/EUROCORES/EUROCORES_Scheme/Reporting/Mid-term_and_final_reports/Final_reports/Batch1/OMLL_Final_report.pdf&t=1435145200&hash=f158382b8b8510f178f1c77c22e72718cadab8e2

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A key added value of OMLL was its ability to facilitate the interaction amongst researchers and scientists, which allowed an interdisciplinary approach where further collaboration was launched. The programme was able to link different disciplines within particular projects and provide links across and beyond projects with both, members from other projects and with new external partners. The OMLL programme was seen by the participants as an opportunity to create a stimulating environment with positive long-term effects in terms of contact and exchange of ideas. A significant number of future and new funding opportunities were opened up as a result of the OMLL programme, which is part of the longer-term impact of the programme.

The OMLL CRP "emergence of grammar in the brain: A comparative study of acquisition, processing and cortical organisation of the structural aspects of language in bilingual and monolingual populations" has helped set a psycholinguistics laboratory at the University of the Basque Country (ELEBILAB), and the EUROCORES team continued their research also in collaboration with the Italian team exploring language discrimination. OMLL has also helped create a strong interdisciplinary working foundation among the collaborating teams, including helping them gain access to competitive funding.

In the case of research groups with less visibility and fewer means, like the linguist group at the University of the Basque Country, the OMLL programme was a significant step towards international collaboration with European researchers. In addition three doctoral researchers who originally trained at the University of the Basque Country are currently postdoctoral researchers in various labs in Europe.

More generally, one of OMLL's Project Leaders also mentioned that the programme was an important step forward for collaboration in the humanities; a discipline that tends to see less collaboration than other fields. Researchers in the Humanities are used to individual grants, i.e. carrying out their research alone or in small groups. In this regard, it was a real achievement of the programme to bring in wide range of research funders. One OMLL Management Committee member pointed out that "even medical research councils put money in to what was really a humanities programme. That is very unusual".

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The table below illustrates the scientific outcomes from various CRPs in the OMLL programme and the added value of OMLL.[196]

CRP	Scientific Outcome	Added Value of OMLL
From symbols to language: The archaeology of the origin of language and early diversification of languages	Demonstrated that long-lasting symbolic traditions existed in Africa well before the arrival of anatomically modern humans in Europe	Studying the origin and the evolution of language was challenging before the launch of the OMLL programme. Now it seem to be a productive field of study and an ideal laboratory for interactions between a range of disciplines and scholars that could not have made contact without this collaborative research scheme.
Early diffusion of domestic bovids in the Middle East and Europe: Transmission of animals, transfer of technical knowledge	The early Neolithic bovid of Europe has very few genetic relationships with the native European wild aurochses. This means that early domestic cattle were introduced from the Near East through Europe, together with sheep and goat. This suggests that a lot of know-how and technical knowledge accompanied the progression of the neolithicisation wave, including probably words and languages.	
The prehistory of Amazonian languages: Ecological and cultural processes underlying linguistic differentiation	This project has shown that the diversification and distribution of Amazonian languages is best understood as the result not of demic migration but of processes of ethnogenesis within regional and interregional systems of exchange.	On-going communication with other OMLL researchers in the context of several workshops has been very stimulating, e.g. by providing comparative material. More generally, the topic of the OMLL programme has provided legitimacy for pursuing research on the geographical distribution of ethno-linguistic identities in prehistory.
Shared mechanisms for speech and gesture recognition?	OMLL was an important scientific opportunity allowing an in-depth investigation on how the motor system participates in perceptual mechanisms. The main results achieved is the discovery that while listening to a speaker, the tongue's motor system is facilitated as if one is internally reproducing what one is listening to. Moreover, the lexical content of the speech influences this facilitation. On the other side, it was discovered that Broca's aphasics have trouble in recognising others' actions. This evidence is further confirmed by the fMRI finding that hand gestures observation specifically activates the inferior frontal gyrus.	OMLL gave us a unique opportunity in terms of sharing of scientific results and in receiving relevant stimuli also from colleagues involved in disciplines apparently far from neurophysiology. This is the confirmation of a trend that, in our view, is underlining a new idea of scientific research: that of a multidisciplinary environment where the borders between disciplines are rapidly disintegrating. Moreover, due to OMLL publicity, the results of the research also reached the large non-specialist audience, as in the case of a substantial article published in the French journal Science et Vie
The emergence of grammar in the brain: A comparative study of acquisition, processing and cortical organisation of the structural aspects of language in bilingual and monolingual populations	Bilingualism has a significant impact on language emergence, representation and processing. Monolinguals and bilinguals already differ at the earliest stages of language acquisition, particularly regarding language discrimination capacities and strategies for lexical representation. In adulthood, results show that high proficiency bilinguals can switch languages at a very low cost, and the switching performance of highly proficient bilinguals is different from that of L2 learners. Moreover certain aspects of grammatical computation are processed differently by monolinguals and bilinguals, and in doing this, some grammatical phenomena that have not been looked at before in processing studies were explored. While consonants are more relevant for segmentation and thus the acquisition of the lexicon, vowels on the other hand – the main carriers of prosody - are mainly involved in the acquisition of grammar. We have also shown that mechanisms of general perception are involved in both.	Both in terms of funding and visibility, participation in this programme has been extremely important. It allowed to strengthen synergies, coordinate efforts among the various teams, and create new research facilities. The programme also gave the opportunity to interact with people working in different disciplines. The workshop organized in Ferrara by Marina Nespor, Luciano Fadiga and Guido Barbujani is an example of this interaction.
Early word segmentation and ration: Psychological responses and electrophysiological	Research on English had shown that (a) segmentation abilities emerge around 8 months, and (b) infants use various cues such as prosodic, phonotactic, allophonic and distributional cues. However, it left open the issue of how infants began to use these cues in the first place, given	The previous conference (in Leipzig) was a great opportunity to meet other European researchers and exchange ideas. In particular, discussions with M. Nespor provided a new framework to explain initial results and extend experimental work on the issue of

[196] http://www.esf.org/fileadmin/Public_documents/Publications/OMLL%20Highlights%20w.pdf

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CRP	Scientific Outcome	Added Value of OMLL
correlates	that these cues are language specific. The research brought new behavioural data (using the Headturn Preference Procedure), showing that French infants initially rely on the syllable, which is the rhythmic unit of French. Follow-up studies are (a) exploring French infants' use of the syllabic unit for segmentation using high-density ERPs, and (b) starting to explore their use of other segmentation cues.	the consonant/vowel asymmetry in early lexical specificity, which led to publication of the first study exploring this issue in young infants (Nazzi, 2005) and opened up a new research field (e.g., Mani & Plunkett, 2007; Nazzi & New, 2007; Curtin et al., 2007), leading to new collaborations (with C. Floccia, University of Plymouth, United Kingdom, and B. Hohle, Potsdam University, Germany). Discussions within the programme also led to the beginning of a collaboration with L. Polka (McGill University, Canada) and Marilyn Vihman (University of York, United Kingdom) exploring the effects of dialectal differences on early linguistic development.
Language and genes of the greater Himalayan region	Researchers found a remarkable degree of genetic diversity in the Himalayas and began to discover how the complex interactions between the extraordinary topography of the region, the languages and the genetics have shaped the patterns seen today.	Without the close interaction – within this project and with other projects within OMLL – with experts from other scientific disciplines, the project would hardly have been possible at all and would not have been so successful. The project has already generated a number of publications and our major findings still have to be fully released. The most pleasing scientific aspect of this project was the opportunity to interact with and learn from international colleagues, local experts, geneticists and the foremost linguistic experts.
The berber and the Berber: genetic and linguistic diversity	This project has confirmed the intricate division of the Berber language group. On the one hand, one has a typologically well-definable unit, Northern Berber, as opposed to a number of other groups. On the other hand, there is hardly anything that confirms the genealogical nature of the Northern Berber sub-group. In fact, what makes up Northern Berber is best described as a linguistic convergence area. As a result, it is questionable that an overall sub-classification is possible at all.	Participation in the OMLL programme has allowed an interdisciplinary approach and talks between geneticists and linguists. Each population has been referenced on the basis of linguistic criteria. The quality of the sampling, the scientific objectives of the project and the necessity to obtain results at the highest scientific level have led to collaborations with internationally famous teams. Moreover a network is now operational, with student exchanges and a common project.
East meets West: Linguistic and genetic comparison of modern Eurasian populations. A joint programme in anthropology, ethnology, linguistics and population genetics	The project worked on the history of populations in two areas, Central Asia and North-eastern India and tried to measure to what extent social organisation has an impact on genetic diversity on Y-chromosome diversity and also on mitochondrial genetic diversity. Results showed that current Turkic speaking populations, but not Indo-European populations, exhibit a significant loss of intra-population genetic diversity for their Y chromosome (transmitted from father to son) as a result of dynamics of their patrilineal descent groups and significant genetic differences among populations regardless of their ethnic group. Moreover Indo-European populations are differentiated by their mitochondrial DNA (transmitted from mother to daughter) whereas current Turkish speaking populations are not differentiated even at the ethnic group level. Regarding linguistic data, researchers were able to design a field study and methodology that enable the computation of linguistic distances.	Working within the OMLL programme was seen as highly profitable. The first OMLL meetings were a great opportunity for meeting colleagues, and contacts were reactivated in the following years with much profit. The workshops organised helped develop these contacts. Researchers mentioned that their work and its impact would have been very different without this context.
Pioneers of Island Melanesia: a joint project between British, Dutch, German and Swedish teams	The aim was to tackle the question of the relationships among a group of Papuan isolate languages which have resisted accepted attempts at demonstration of interrelatedness. Instead of using existing vocabulary-based methods, which cannot be applied to these languages due to the paucity of shared lexemes, a database of 'structural features' – abstract phonological and grammatical features apart from their form was created. Research showed that using biological methods, such as maximum parsimony, Bayesian phylogenetic inference, and structure algorithm, on structural features can be a valid way of extracting linguistic history.	The project benefitted from the collaboration, especially between the linguists based in Nijmegen and Stockholm and the biological anthropologists based in Cambridge, in applying computational methods developed in biological sciences to linguistic data. This has further resulted in collaboration with population geneticists and evolutionary biologists. One of the outcomes of this project has been the NWO funded programma "Breaking the time barrier: Structural traces of the Sahul past". In this program additional computational methods are explored to investigate the history of linguistic structures, both in terms of correlated evolution of such features and in terms of their capacity to signal ancient migration patterns in the area of New Guinea and Australia.
Language, culture, and genes in Bantu: A multidisciplinary	Overall, there tends to be no correlation between mtDNA sequences and language in the Solomon Islands in Island Melanesia. However, one island (Santa Cruz) is an outlier in terms of	

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CRP	Scientific Outcome	Added Value of OMLL
approach to the Bantu-speaking populations of Africa	its mtDNA sequences; this population appears to be more closely related to populations in New Guinea and the Bismarcks to the northwest rather than to its geographic neighbours in the Solomon Islands. More work is carried out with linguists and archaeologists to try to decipher the population history of the inhabitants of Santa Cruz.	
Action, gesture and words in a developmental and evolutionary perspective	The main finding of our work on the interplay between gesture and speech is that there is a continuity between an earlier 'preverbal' and a subsequent, functionally 'equivalent', linguistic stage. The collaboration with colleagues from Sweden gave an opportunity to highlight that gesture is a robust developmental phenomenon, exhibiting similar features across different children and cultures. Main findings confirmed that, since the early stages, language can be considered as a gesture-speech integrated system, both in typical and in atypical development. Moreover developmental data support the neurophysiological perspective that language exploits the pre-existing multimodal character of the sensory-motor system. Natural language is a symbolically embodied social construction, related to other aspects of human cognition that arose from previously existing social communicative activities.	The OMLL programme and the possible collaborations it has made are to a large extent responsible for the fruitful emphasis that was laid, on the 'mirroring system' and its putative role as the basis for mindreading abilities.
Mindreading and the emergence of human communication	Drew a rather unexpected connection between the capacity for simulation (which many take to be centrally involved in mindreading) and specific linguistic features such as the existence of so-called 'intentional operators'. Established this unexpected connection in attempting to account for a distinctive characteristic of human thought-processes: 'their capacity to be detached from present activity and circumstances' (Dummett).	Participating in the OMLL programme provided an opportunity of a closer interaction with other philosophers, linguists and cognitive neuroscientists in Europe, has made the group known to more people sharing our interests and thus has opened up new research opportunities. In 2004, in part with the help of funding from the project, the first joint venture of the European Society for Philosophy and Psychology and the (American) Society for Philosophy and Psychology was organised.
Comparison between processes in language acquisition by children and language evolution	The main objective of this project was to describe the relationships between children's pre-linguistic vocalisation patterns and characteristics of the production system as well as to explore the relative role of learning from ambient language input in children acquiring different languages. These goals have fully been reached, especially for the first period under examination (babbling period, 8-12 months of age). Moreover the results were able to confirm the predictions made by the 'Frame-content' perspective on languages which have not yet been studied. But, it also raised some questions concerning the proposed model in so far as unpredicted behaviours emerged from the data.	The OMLL programme helped launch new international collaborations with researchers from the same field. (e.g., organising an international conference 'ELA2005: Early language abilities', 8-10 December 2005)
Orofacial control in communication in human and non-human primates	A major advance in this research was the discovery that baboons were strongly lateralised in favour of the right-hand not only for bimanual coordinated manipulation but also to a higher degree for the use of intentional gestures. Individual hand preferences for gestures showed no correlation with those for bimanual actions. A hypothesis was hence proposed that a specific left-lateralised communicatory cerebral system, different from the one involved in manipulative actions, may control communicative gestures. Results therefore brought additional support to the view that lateralisation for language in humans may have evolved from a gestural system of communication lateralised in the left hemisphere.	The participation in the OMLL programme was of the utmost importance for presenting and discussing work and for meeting other scientists with whom further collaboration was launched. Moreover constant contact with partners in the programme, in order to exchange on our respective projects, were maintained. This collaboration allowed organising with partners in May 2007 the VOCOID International Conference in Grenoble (VOcalisation, COmmunication, Imitation and Deixis in infant and adult human and non-human primates).
The origins of primate semantic and syntactic abilities	Progress on questions concerning the evolutionary origins of human linguistic abilities has been made. The research has shown that non-human primates are able to produce calls that function as referential signals that are meaningful to recipients and that there are substantial interspecies differences in the kinds of vocal systems used by primates to encode events in the environment. Another important outcome concerns the question about the origins of syntax where research has shown that free-ranging putty-nosed monkeys combine two vocalisations into different call sequences that are linked to specific external events, such as imminent	The OMLL programme has allowed us to build a number of international collaborations that have strengthened research, notably with colleagues at the various universities The programme has enabled supervision and co supervision of several Masters and PhD theses, most of which have led to publishable results. Finally, OMLL-mediated funding has allowed maintaining the field site in the Tai Forest, Ivory Coast, despite substantial political difficulties in the country.

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CRP	Scientific Outcome	Added Value of OMLL
	group movement and predator presence. Non-human primates are capable of combining calls into higher order sequences with novel meanings, a fundamental prerequisite for any grammatical system.	
The cultural self-organisation of cognitive grammar	The work has covered the problem of language emergence and acquisition, from theoretical simulation results to human fMRI studies and to implemented robotic systems that demonstrate language acquisition. These results demonstrate how a model of grammatical construction processing, based on the known neurophysiology, can learn reduced versions of English, French and Japanese and how this learning can take place in a physical, robotic system. Furthermore, we are now investigating how this framework can lead to the next generation of human-robot interaction systems.	Participants through that OMLL program have significantly enriched the scope of their approach. Overall OMLL, provided exposure to the wide diversity of approaches to man and language has provided – and continues to provide – a network of connections in vast domains including primate neurophysiology and development that has been extremely complimentary to our modelling activity

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1.5 Challenges to the projects and how these were met

The main challenges in OMLL related to organisational cooperation and to funding from national agencies. For example, in one CRP some coordination difficulties arose between the Spanish and Italian authorities regarding the timing and funding of the projects. However the scientific collaboration initiated though this CRP continues to date. Similar challenges also arose in other CRPs.

Some participants faced difficulties as funding at national level was cut against the original budget. In at least one case the research budget was cut by half.

The final Review Panel report recommended that in order to better facilitate interdisciplinarity, future programmes might do well to provide training of young researchers to help them advance. Interdisciplinary training would ideally be part of a pan-European, programme in which high-level, thematic, interdisciplinary summer schools at post-doc level could be organised. These training facilities would offer attractive opportunities for talented young researchers, also in view of countering 'braindrain' of European researchers.

1.6 Conclusions

The OMLL programme was an innovative initiative that was made possible thanks to recent advances in a.o. genetics research, as well as a commitment from a range of disciplines and funders to pool resources which normally did not tend to collaborate. The programme was an extensive undertaking 20 collaborate projects.

Although some of the CRPs performed better then others, overall the OMLL programme opened up new research opportunities and facilities, which resulted in significant scientific outputs and helped to define new questions for future research. The programme established itself as a world-leader in the area of interdisciplinary research in its field(s).

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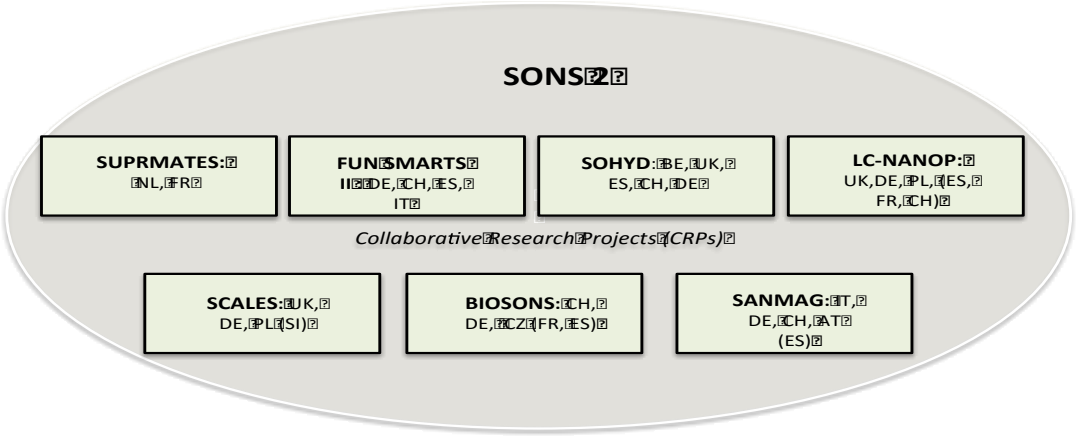
Case Study 9: Self-Organised NanoStructures (SONS 2)



1.1 Overview

With a total budget of EUR 8 million, SONS 2 was launched in May 2005. SONS 2 was made up of seven CRPs that covered a broad range of scientific topics within the area of supramolecular approaches to functional materials.[197] The programme, which ran 2007-2009, brought together 51 research groups from 15 countries.[198] The main goal of SONS 2 programme was to develop a cross-disciplinary research at the interface between Chemistry, Materials Science, Nanoscience, Physics and Electrical Engineering and to generate fundamental knowledge about interactions governing self-organisation (or self-assembly) processes in complex systems such as supramolecules and nanostructures.[199]

CRP	Project Leaders (PL)/ Principle Investigators (PI)/Country
SUPERMATES SUPRAmolecular MATerials for new functional Structures	Paolo Samorì (IT) PL Klaus Müllen (DE) PI Richard H. Friend (UK) PI Johan Hofkens (BE) PI Franco Cacialli (UK) PI Alan Edward Rowan (NL) Associated Partner Nanochemistry Laboratory, Insititut de Science et d'Ingénierie Supramoléculaires (ISIS) (FR) Collaborator
FunSMARTS II Assembly and Manipulation of Functional Supramolecular Nanostructures at Surfaces	Mario Ruben (DE) PL Harald Brune (CH) PI Jaume Veciana Mir0 (ES) PI Klaus Kern (DE) PI Nian Lin (DE) PI Fabio Biscarini (IT) PI Alessandro De Vita (IT) PI
SOHYD -Self-Organized Hybrid Devices	Francesco d'Errico (France) PL Paul-Louis van Berg (Belgium) PI
LC-NANOP- Liquid Crystals Nano-	John Goodby (UK) PL

[197] SONS 2 Final Report
[198] http://www.esf.org/coordinating-research/eurocores/completed-programmes/sons-2.html
[199] http://www.esf.org/coordinating-research/eurocores/completed-programmes/sons-2.html

CRP	Project Leaders (PL)/ Principle Investigators (PI)/Country
particles	Heinz Kitzerow (DE) PL Ewa Gorecka (PL) PL José Serrano (ES) Associated Partner Daniel Guillon (FR) Associated Partner Robert Deschenaux (CH) Co-operating partner
SCALES- Complexity across lenghtscales in soft matter	Goran Ungar (UK) PL Carsten Tschierske (DE) PI Volker Abetz (DE) PI Robert Holyst (PL) PI Martin Bates (UK) PI Janez Dolinšek (SI) Associated Partner
BIOSONS- Biofunctional Self-Organized Nanostructures of ionic/non-ionic amphiphilic copolymers, biopolymers-biomacromolecules and nanoparticles: from Bioinspired to Biointegrated systems	Wolfgang Meier (CH) PL Axel Mueller (DE) PI Petr Stepanek (CZ) PI Matthias Ballauff (DE) PI Helmut Schlaad (DE) PI Associated Partners: Günter Reiter (FR) Associated Partner Oleg Borisov (FR) Associated Partner José Rodríguez-Cabello (ES) Associated Partner Frédéric Nallet (FR) cooperating Partner
SANMAG- Self-Assembled Nanoscale Magnetic Networks	Carlo Carbone (IT) PL Stefan Blügel (DE) PI Harald Brune (CH) PI Klaus Kern (DE) PI Peter Varga (AT) PI Pietro Gambardella (ES) Associated Partner

In total, nine funding organisations supported the SONS 2 programme: Austrian Science Fund; Fund for Scientific Research – Flanders, Belgium; Czech Science Foundation; Deutsche Forschungsgemeinschaft (DFG) German Research Foundation; National Research Council, Italy; Polish Academy of Sciences; Ministry of Science and Education, Spain; Swiss National Science Foundation (Switzerland); and the Engineering and Physical Sciences Research Council, UK.

1.2 Background

SONS 2 concerned the utilisation of supramolecular interactions for the synthesis and positioning of functional assemblies, macromolecules, dendrimers, liquid crystals, tailor-made polymers and inorganic nanoparticles. Ultimately molecular self-assembled architectures may find applications in advanced technologies such as new chip technologies (DNA probes, lab-on-a chip), sensors, transistors, data storage, light-emitting diodes, communication technologies, magnetic information storage, photovoltaic cells, and molecular motors and machines. Therefore over the past few decades techniques for directing the assembly of molecules have been intensively pursued. On the molecular scale these include ionic interactions, metal–ligand interactions, and hydrogen- and p-bonded complexes. At a higher hierarchical level assembly occurs by means of the complementary and antagonistic interactions present in liquid crystalline mesophases and phase separated block copolymers. Indeed researchers can now design materials that assemble themselves into complex, finished structures.

Self-assembly is an example of a subject in which both engineering development and the resolution of fundamental scientific problems are essential for realising the full potential that

SONS offer. For this reason, by bringing together expertise from a range of backgrounds and countries, the programme aimed to develop cross-disciplinary research at the interface between chemistry, materials science, nanoscience, physics and engineering. As the name suggests, SONS 2 was a continuation of the three-year EUROCROES programme SONS 1 (2003-2006), which was also concerned about with nanosciences.

The SONS programmes were supported as nanosciences is a rapidly growing field, and a science and technology priority in in many countries. As a result there are many national nano research programmes. The pan European EUROCORES SONS programme was set up to further the interdisciplinary of this field.

1.3 Activities undertaken and outputs

The first SONS 2 meeting was held in December 2006 in Strasbourg. The principal networking activities for SONS 2 were a series of conferences, workshops and international schools as well as short visits and exchanges.

Between 2007 and 2009 several workshops, symposia, meetings, international schools as well as short visits and exchanges took place in various countries such as: **EUROCORES Workshop on Self-Organised NanoStructures (SONS 2) at the EMRS Spring Meeting (May/June 2007, France); EuroDYNA Round Table meeting** (December 2007, Portugal); **Workshop 'Magnetism at Surfaces'** (September/October 2008, Germany); **SONS 2 Workshop 'Self Organised Nano-Structures in Liquid Crystals' September 2008 (Italy); SONS 2 Symposium at the EMRS Spring Meeting 2008 May 2008 (France); SONS 2 Session during the MRS Meeting** (December 2008, United States); **Symposium at ICAM** (September 2009, Brazil); **Final Conference** (October 2009, Prague). The progress was presented and future research directions were outlines in the presence of 80 scientists of all seven collaborative research projects.

A broad range of range topics from complex liquid crystals structures and organic materials for opto-electronics to molecular self-assembly and supramolecular organisation on surfaces were covered by international speakers and through poster and oral presentations. Many joint publications appeared in peer-reviewed journals and two notable highlights are the special issues of Advanced Materials and Advanced Functional Materials.

1.4 Results and impacts

According to our research, the majority of participants of the SONS 2 programme believed that most of the scientific objectives were achieved and that the programme made a very significant contribution to scientific knowledge.

As shown in details in the table below, projects under the SONS 2 programme opened up new research opportunities and facilities, which resulted in various significant scientific outputs and helped to define new questions for future research. The programme has established itself as a world-leader in the area of cross-disciplinary research at the interface between Chemistry, Materials Science, Nanoscience, Physics and Electrical Engineering.

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The main added value of SONS 2 was its ability to facilitate the interaction amongst researchers and scientists, which allowed an interdisciplinary approach where further collaboration was launched. Results obtained in both SONS 1 and 2 are said to have contributed to the development of new and more efficient energy harvesting systems such as solar cells, high-performance organic light-emitting and molecular electronic devices, high-density magnetic memory storage devices, and targeted drug delivery and cancer therapy tools. The CRPs under SONS 2 have contributed several internationally-competitive breakthroughs[200] as well as resulted in various publications.

SONS 2 received a very positive final review by the Review Panel, who said that the programme enabled different communities, each with their own expertise, to pool and enhance their resources thus creating conditions for the stimulation of research activities throughout Europe. Networking activities played an important role in improving information sharing and facilitating a high number of common publications.[201]

One SONS 2 participant emphasised the importance being able to collaborate at the highest levels with a minimum administrative burden. Several other participants commented through our survey that the programme outcomes could not have been achieved without the transnational dimension.

[200] SONS 2 Final Report
[201] Ibid.

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The table below illustrates the scientific outcomes from various CRPs in the SONS 2 programme and the added value of SONS 2.[202]

CRP	Scientific Outcome	Added Value of SONS 2
SUPRAmolecular MATerials for new functional StructurES (SUPRAMATES)	The CRP provided a detailed understanding of the structural, mechanical, optical, electrical and electronic properties of multichromophoric arrays based on ultrastiff polysicocyanodipeptide chains exposing perylene dyes in the lateral positions. Such a scaffolding approach made it possible to achieve full control over the position and orientation of functional units in view of the expected self-assembly behaviour, in particular to tune the interchromophore interaction	In addition to various publications, the CRP greatly succeeded in combining the supramolecular chemistry of multifunctional systems and the nanostructure of interfaces. New materials have been developed and their properties studied using a great diversity of techniques available in the CRP. The knowledge acquired in SUPRAMATES is believed to be of importance for the optimisation of macroscopic devices such as solar cells, FETs and light-emitting diodes. In addition, the proposed scaffolding approach is of general applicability and interest in the design of building blocks for technologically important functional materials and the potential applicability of supramolecular nanostructures may span from robotics (for artificial muscles), to (bio) materials science. The use of single supramolecules as electro-active building blocks can be expected to pave the way towards inexpensive products with new sets of properties tailored at the single molecule level.
Assembly and Manipulation of Functional Supramolecular Nanostructures at Surfaces (FunSMARTs II)	An important result centres on the control of magnetic anisotropy which is a key issue in the development of metal–organic materials for magnetic applications. Another highlight is the full spatial structural elucidation of disordered coordination architectures that was achieved using STM directly probing the pertaining molecular-level arrangements.	In addition to various publications, The CRP created a high level of scientific collaboration and work that was carried out within it is at the forefront of research addressed towards the preparation and study of functional supramolecular nanostructures at surfaces
Self-Organised Hybrid Devices (SOHYD)	ability to control nano-morphological organisation at the device level as well as a contribution to the fundamental understanding of light emitting diode function	The main achievements of the CRP concern both basic and applied science and the quality of the research is of highest level. This is demonstrated by a number of research papers in high ranking journals and the knowledge transfer activities that have stemmed from the work. Both of these also prove an excellent level of integration between the groups of the CRP; the combination of expertise has resulted in several excellent scientific contributions.
Crystals Nano-particles (LC-NANOP)	CRPs gave rise to organic, inorganic and metal based NPs. Moreover Two novel systems produced by the CRP particularly stand out: the first examples of Janus dendritic LCs were created where one face of the supermolecules was composed of disc-like LCs, whereas the other face was composed of rod-like liquid crystals.	The CRP facilitated interaction between individual projects which were specialised in different fields of synthetic chemistry, analytical and physical chemistry, physics and chemical engineering, providing an excellent platform for the development of multidisciplinary research. Moreover many of the results were found to be applicable to other research areas including (opto) electronic devices.
Complexity Across Lengthscales in	The CRP made significant contributions to the understanding	Enabled access to specialist knowledge and research facilities not available in each

[202] Ibid.

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CRP	Scientific Outcome	Added Value of SONS 2
Soft Matter (SCALES)	of fundamentals of building hierarchical order in nanostructured LC systems, and brought structural variety and complexity in soft matter to a qualitatively new level	individual country – no one country could have afforded a match of the quality and diversity of the combined expertise. Interdisciplinary was the cornerstone of this project and gathering together synthetic and physical chemists from the fields of low molecular weight compounds and polymers, as well as physicists, structural, material and simulation scientists proved highly successful and productive. Moreover possible future collaborations and grant proposals/funding sources
Bio functional Self-Organised Nano-Structures of Ionic/Non ionic Amphiphilic Copolymers, Biopolymers-Biomacromolecules and Nanoparticles: From Bioinspired to Biointegrated Systems (BIOSONS)	Preparation of new, bio inspired and biological materials that interface synthetic and living matter as well as developing a better understanding of the processes occurring at these interfaces fabrication of new, nanostructured surfaces that are able to actively produce bioactive compounds.	Significant steps forward were made in terms of creating new bio functional self-assembled nanostructures based on amphiphilic polymers, peptides and proteins. The results of the physicochemical experiments gave new insight into the interactions between biological and synthetic molecules, and allowed the development of new tools for investigating the behaviour of individual biological molecules or the effect of spatial confinement and local crowding on biological reaction pathways.
Self-Assembled Nanoscale Magnetic Networks (SANMAG)	New magnetic phenomena were discovered, such as spin spirals which were found in nanostructures. Feasibility of tuning and controlling magnetic properties of miniaturised functional magnetic elements in atomic-scale structures, built by self-assembly processes	The strong degree of interaction among the partners is demonstrated by the number and high level of the joint publications.

1.5 Challenges to the projects and how these were met

Although collaboration is important, a number of our survey responses suggested that more financial recourses should be directed to research than to 'collaboration' 'exchange' 'dissemination' etc. Collaboration should come as result of research not as goals themselves in the research project. Some financial resources are necessary for maintaining the research infrastructure; nowadays it is easier to get money for new equipment that for maintenance of existing one.

The Review Panel felt that more could have been done to reach a wider audience. Research activities that were presented to the general public through press releases, TV appearances, and popular scientific communications were thought to be somewhat limited. More of these outreach activities should be activated in order for the subject to gain and maintain the support of European citizens.

1.6 Conclusion

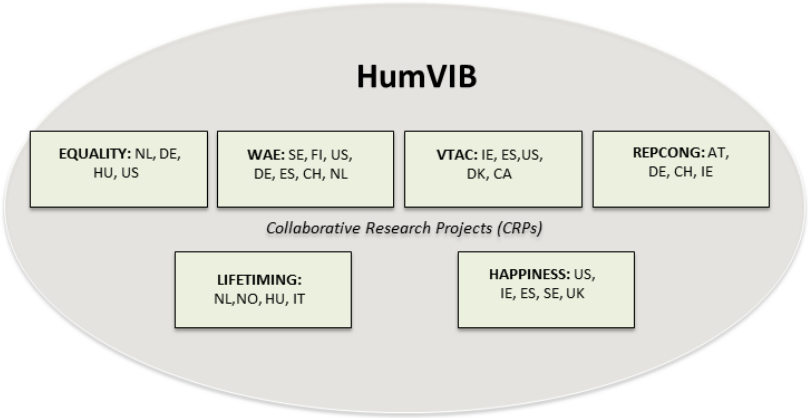
The Review Panel provided a very positive final review on the SONS 2 programme, and commented in the final report that SONS 2 "has been very successful in bringing together world-class research groups and in producing high level and innovative scientific achievements."[203] Broad ranges of scientific topics were covered and topics within the area of supramolecular approaches to functional materials and generated a substantial amount of both fundamental and applied knowledge.[204] The programme involved high calibre of researchers and scientists. Participants enhanced and utilised the available resources across Europe, which had a very positive impact on the various topical domains under examination.

Moreover the development of co-publications were facilitated by various networking activities and different conferences, symposia and workshops. These all had a significant impact on the fundamental research, and the achievements of the CRPs. The Review Panel rated the dissemination of the research from 'very good' to 'excellent'.[205] Generally, SONS II succeeded in significantly contributing to the European research portfolio and was seen as a well-focused and well-organised programme.

[203] Ibid.
[204] Ibid.
[205] Ibid.

D. Case Studies

Case Study 10: Cross-National and Multi-Level Analysis of Human Values, Institutions and Behaviours (HumVIB)



1.1 Overview

The Cross-National and Multi-Level Analysis of Human Values, Institutions and Behaviours (HumVIB) was a EUROCORES programme composed of six CRPs:

- Gender Inequality in a Comparative Perspective (EQUALITY);
- Welfare Attitudes in a Changing Europe (WAE);
- Voter Turnout and Abstention in Context (VTAC);
- Representation in Europe: Policy Congruence between Citizens and Elites (REPCONG);
- The Timing of Life: Understanding Cross-National Differences in the Organisation of the Life Course in Europe (LIFETIMING);
- Happiness, Political Institutions, Natural Environment and Space (HAPPINESS).

In total, 15 countries participated in the Programme, which ran between 2008-2011. The researchers were supported by national funding agencies: the Austrian Science Fund; Academy of Finland), the German Research Foundation; the Hungarian Scientific Research Fund; the Irish Research Council for the Humanities and Social Sciences; the Netherlands Organisation for Scientific Research; the Research Council of Norway; Ministry of Science and Innovation in Spain; Council for Scientific Research CSIC, Spain; the Swedish Council for Working Life and Social Research; the Swiss National Science Foundation; and the National Science Foundation in the USA.

The remaining countries, namely, Italy, Denmark, the UK, and Canada had participants involved as Associated Partners, who were part of HumVIB without being sponsored by a national agency (i.e brought their own external funding).

The six CRPs functioned as umbrellas for in total of 24 Individual Projects. Total funding amounted to just over EUR 4 million, which were granted over a period of three or four years,

depending on national rules for the agency in charge. In total, the programme consisted of 27 research teams (75 researchers) across Europe and North America.[206]

1.2 Background

The HumVIB programme was centred on the use of quantitative social science methods for exploring changes in populations' views and attitudes. The overarching objective of the HumVIB programme was "*the realization of the concept of Europe as a natural laboratory for the social sciences in which the diversity of institutions, practices, histories, and resources enables researchers to analyse how human values, attitudes and behaviour are affected by the characteristics of the multi-level systems or contexts in which they occur*".[207]

The concept of Europe as a natural laboratory for the social sciences first emerged in the 1950s. Researchers at the time began to lay the groundwork for a genuinely comparative European social science, however there were a number of significant barriers in place that needed to be overcome. At national level there was a lack of comparable data – at an individual level as well as aggregate level. There were also challenges related to statistical method, particularly in the area of cross-level inference. Over time, these issues have diminished, partly due to progress in data collection and data management, but also as a result of improvements in statistical methods.

Researchers in the field felt that potentially major scientific breakthroughs were being held back by the absence of a coordinated programme. The HumVIB EUROCORES programme was designed to address this concern by combining:

- The unprecedented individual-level data resources now available in Europe and typified by the European Social Survey (ESS). The ESS is an academic led cross-national survey, since 2001 has been conducted every two years across Europe. The scope of the survey is to measure attitudes, beliefs and behaviour patterns of different population in over thirty nations;
- Comprehensive system-level and contextual data;
- Appropriate new methods of multi-level analysis;
- The testing of carefully elaborated theories of the effects of institutions and structures or, more generally, contextual factors on individual attitudes and behaviour.[208]

The overall objective of the HumVIB programme was to undertake a benchmarking exercise to test research quality, improve access to data, and achieve new developments in the area.

The HumVIB programme grew out of research published in Vol. 13, No. 4, of Political Analysis in autumn 2005 – a Special Issue on Multi-level Modelling for Large Clusters.[209] Building on this (as well as other) research, the HumVIB theme proposal was accepted, and the ESF agreed with funding organisations in Austria, Belgium, Bulgaria, Cyprus, Finland, Germany, Hungary, Ireland,

[206] ESF EUROCORES Programme Cross-National and Multi-Level Analysis of Human Values, Institutions and Behaviour (HumVIB) Final Report
[207] Cross-National and Multi-level Analysis of Human Values, Institutions and Behaviour (HumVIB). See http://www.esf.org/coordinating-research/eurocores/completed-programmes/humvib.html
[208] Cross-National and Multi-level Analysis of Human Values, Institutions and Behaviour (HumVIB). See http://www.esf.org/coordinating-research/eurocores/completed-programmes/humvib.html
[209] ESF EUROCORES Programme Cross-National and Multi-Level Analysis of Human Values, Institutions and Behaviour (HumVIB) Final Report

the Netherlands, Norway, Portugal, Romania, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States to launch a Call for Proposals in early 2007.[210]

The Call drew 28 outline proposals and 16 of these were positively evaluated, allowing them to progress to the Full Proposal Stage. In the end, six CRPs received funding. According to the HumVIB programme's final report it was "*regrettable that some of the individual partners in the selected collaborative projects did not, at the end of the day, get support from their national funding agencies and so were unable to take part. In these instances, the mechanisms of the EUROCORES scheme displayed some of the tensions between intergovernmentalism versus supranationalism. It was furthermore a loss for the programme that an envisaged 'support' project specialising in data management and methodology was not among the final line-up of funded projects*."[211]

This comment is echoed by interviews undertaken for this study. One participating researcher, the Project Leader for LIFETIMING, indicated that overall, the selection process was easy and worked well with one exception. Key scientific collaborators from Italy were in the end not able to participate, as the national funding agency could not secure funding. One participant of the project commented that this imperfect selection process in turn underlined a weak element of the EUROCORES scheme – namely that researchers were (indirectly) incentivised to look for partners with guaranteed funding rather than with the scientific expertise,[212] which potentially risks compromising the research involved.

According to our interview with a HumVIB Management Committee member, the selection process used under EUROCORES has 'evolved' since, and European programmes today (such as ERA-Net) follow different procedures, which might be considered improved in comparison with those adopted by ESF.[213]

1.3 Activities undertaken and outputs

The programme kicked off with a conference in Dublin in 2008. All Project Leaders and Principal Investigators participated to discuss the common ground across the six CRPs and how this could be built on.

HumVIB had a number of specific elements – it was made up of CRPs which undertook 'standard social sciences research', but also two CRPs to provide research and support. One developed and provided support for data construction and archiving, and the second provided methodological support and development in the statistical technique of multi-level models.[214]

Although on one level, this made collaboration across CRPs more challenging (in terms of diversity of topics), it was equally an opportunity to engage researchers in cross-CRP activities such as training courses, workshops, short-term visits and dissemination events, sometimes involving external experts. Often HumVIB activities were embedded in larger events. The

[210] Cross-National and Multi-level Analysis of Human Values, Institutions and Behaviour (HumVIB). See http://www.esf.org/coordinating-research/eurocores/completed-programmes/humvib.html
[211] ESF EUROCORES Programme Cross-National and Multi-Level Analysis of Human Values, Institutions and Behaviour (HumVIB) Final Report
[212] Interview feedback
[213] Interview feedback
[214] Professor Brian Francis, Lancaster University, UK Experiences of peer review in an international context – the EUROCORES HumVIB programme

common goal was to create new networks and connections, to build capacity and to train early career researchers. This included forging connections between the European and North American researchers involved in HumVIB. Events should also help disseminate research results.[215]

This research exchange and collaboration between CRPs was helped by the ESF's Science Officer, who showed continued interest in the project and who "contributed to a very constructive and stimulating research collaboration".[216] The hands-on role of the Science Officer was considered to be "very important for the successful roll out of the project" and an added value to the research compared to other European funding programmes.[217]

1.4 Results and impacts

The HumVIB programme's individual CRP level objectives were largely achieved. However, according to our interviews, the researchers involved discussed extensively to what extent the programme objectives were met. It was felt that at the programme level, the impact was less visible. A more detailed overview of each of the CRPs is provided in the table below, along with some illustrations of the results and findings.

A key added value of the research being undertaken under EUROCORES was that it allowed participants to be involved in basic research while also having the resources to publish and disseminate. The scientific outputs generated have had a positive impact since they have been published and referenced by the research community. The research produced also revealed important data and knowledge about the general populations in Europe and therefore has potential impact to influence policymakers.

One participant stated that EUROCORES "*was key in promoting innovative ways of conducting research collaboration projects on topics that are thoroughly scientifically driven. In this way EUROCORES is very different from programmes like FP7 and Horizon 2020*."[218]

The final report of the programme echoes this view, writing that "*The ESF has to be praised for stimulating this understanding through the EUROCORES programme HumVIB. The programme allowed the application of new methodological tools (multi-level analysis, GIS), and the use of new datasets (ESS) to tackle existing and new substantive questions*."[219]

[215] ESF EUROCORES Programme Cross-National and Multi-Level Analysis of Human Values, Institutions and Behaviour (HumVIB) Final Report
[216] Interview feedback
[217] Interview feedback
[218] Interview feedback
[219] ESF EUROCORES Programme Cross-National and Multi-Level Analysis of Human Values, Institutions and Behaviour (HumVIB) Final Report

D. Case Studies

Overview of HumVIB CRPs and selected findings

CRP	Overview	Selected findings
Gender Inequality in a Comparative Perspective (EQUALITY)	The CRP has shown the importance of macro-micro interactions in understanding gender inequality.	• The project has shown how the institutional context of countries buffers or reinforces the career disadvantages associated with motherhood depending on the family model they are facilitating and the labour market outcome in question. • The project also explored the impact of economic development and other macro-level factors on gender inequality at the bottom of the social hierarchy. In the relatively homogeneous context of Central and Eastern Europe, the project found a positive relationship between gender inequality and fast-paced, foreign investment-led growth. Women did worse in countries that followed neo-liberal structural adjustment edicts more closely.
Welfare Attitudes in a Changing Europe (WAE)	This project established a comprehensive research programme on citizens' attitudes towards welfare policies across European countries.	• The analyses have broadened and specified the dependent variable(s) in the analysis of welfare attitudes. Previous research has to a large extent focused on what might be termed general welfare state support, regardless of what method was chosen to measure it. In this project's analyses, the researchers went beyond a focus on only welfare attitudes in this restricted sense; and also took into account welfare state evaluations, welfare chauvinism, and age- and class-specific policy areas.
Voter Turnout and Abstention in Context: A multi-level analysis of the factors affecting voter turnout and abstention in systems of multi-level governance (VTAC)	Important progress was made towards understanding political parties' strategic incentives to mobilise low-income citizens, both in the contemporary and historical context. the same political party.	• The analysis indicated that the relationship between social exclusion and voter turnout reflects cross-national variance in the electoral power of a low-income voting block. • A long-standing puzzle in electoral research is why the disproportionality of electoral systems has a negative effect on voter participation in established democracies, but not in new democracies. The project's Spanish team proposed a learning theory of electoral system's effects, and tested it in a cross-national analysis and by using Spain as a case study. The results confirmed that electoral disproportionality is unrelated to voter participation in early elections after democratisation, but the relationship is increasingly visible as democracies grow older.
Representation in Europe: Policy congruence between citizens and elites (REPCONG)	The project focused on: (1) the determinants of policy congruence and the impact of political institutions and direct democracy, in particular; (2) how policy congruence impacts on people's perception of representation and their satisfaction with democracy as well as the perception of specific representative institutions, such as national parliaments/governments and	• A key contribution was the development of an improved method of scaling mapping of individual and party positions into a common political space. This method, operating through the estimation of an individual transformation parameter for each individual, allows for more meaningful comparisons of citizens' and elites' position on multiple issues, which will be of great value for the study of policy congruence in the future. • The project's Finnish team established a new platform for election manifestos, where currently about 1,000 party manifestos from 18 European countries are made available to an interested public. The team also applied multi-level models to the study of representation and policy congruence. These models are of particular value when studying sub- constituency representation as we can easily identify socio-structural subgroups of the population (e.g., women, the poor) and are relevant for cross-country comparisons as they account for composition effects.

D. Case Studies

CRP	Overview	Selected findings
	European institutions.	
The Timing of Life: Understanding cross-national differences in the organisation of the life course in Europe (LIFETIMING)	The broad objective of the Timing of Life project was to explain variations in the views of European men and women on the organisation of the life course. Three main research questions were posed: to what extent is the life course perceived as a structured sequence of life stages, and which events mark the transition from one stage to another? Do social norms concerning the life course exist and, if so, to what extent are these norms backed by sanctions? To what extent and in what ways do individuals engage in active life planning?	• One of the key questions of the CRP was to examine the extent to which age- and sequencing norms are still operative within Europe. It is often assumed that such norms are weakest in more individualised societies, like Scandinavian ones. One of the key findings was that – although such norms in general are indeed weaker in Scandinavian countries than in many other parts of Europe – new norms seem to be emerging in Scandinavia as well. For instance, there are stricter norms in Scandinavian countries about the timing of leaving home than in many other countries. Such findings question the idea that individualisation simply implies the weakening of norms, but rather suggest that new norms (e.g., one should not stay in the parental home too long, or one should not marry without prior cohabitation) are replacing older ones.
Happiness, Political Institutions, Natural Environment and Space – A comparative analysis of the influence of environmental conditions, environmental regimes and political context on subjective well-being (HAPPINESS)	The overarching objective of HAPPINESS was to shed light on how multi-level heterogeneity helps explain the variation in subjective well-being across European countries and regions.	• The project collected data on a variety of environmental indicators that previous literature suggested has an impact on SWB in order to study the role of location-specific factors on SWB across Europe, regarding environmental quality and pollution, climate, land use, regional socio-economic and socio-demographic characteristics and political/institutional context. • Environmental and institutional data were merged with individual-level European Social Survey (ESS) data using Geographical Information Systems (GIS). Further work concerned an estimation strategy and econometric analysis, using the datasets created above to produce an all-inclusive, comprehensive paper that links the regional variation in SWB across Europe to differences in all the location specific factors for which we have collected data. • The project has pioneered the use of Geographic Information Systems (GIS) for the spatial representation of data and to link data on environmental conditions at the regional level with individual-level data from the ESS. This is necessary to account for the wide variation of individual life- satisfaction scores across countries and, particularly, among different regions within the same country.

Source: ESF EUROCORES Programme Cross-National and Multi-Level Analysis of Human Values, Institutions and Behaviour (HumVIB) Final Report

D. Case Studies

The final HumVIB conference in Berlin and subsequently the programme's final report makes a point about the sustainability of the programme, admitting that it the "HumVIB programme should be viewed as a 'kick-off' for empirical research into European diversity rather than as its final word". There is an agreement that our understanding of cross-national differences is still often only sketchy. This lack of understanding needs to be further explored. The final report recommends further investigators to establish solid databases and further methodological innovations.[220]

1.5 Challenges to the projects and how these were met

As many other EUROCORES programmes, the HumVIB activities were somewhat hampered by the lack of buy-in from all the funding agencies, and some key researchers were as a result unable to join the programme to the extent originally envisaged.

Another key challenge was the time restriction. Despite the aim to design an overall coherent programme, and the CRP activities being based on joint and collaborative principles, the diversity between projects was a fact. Moreover, it was difficult to adopt a full pan-European approach in the implementation of the CRPs. In certain cases, the diversity was simply due to the area of research.

1.6 Conclusions

The HumVIB programme set out to make a general impact on social sciences, contribute to the ESS, and further our understanding of human behaviour to improve policy making. One of the main benefits of being part of EUROCORES was that it allowed for extended international collaborative research, especially by involving southern and eastern European countries. This is considered as a great value of the scheme since, generally, in the research sector, a full pan-European approach is difficult to design and implement.

Yet the programme composition was somewhat of a double-edged sword. On the one hand, the diverse set of CRPs developed to make up HumVIB was key to produce quality research and to make progress towards the objectives originally set out. On the other hand, the programme was an example of the challenges involved in interdisciplinary and international. Indeed, there was a substantial degree of interdisciplinary *within* each CRP, which meant that significant efforts were needed to manage each individual CRP, ultimately hampering collaboration at the programme level.

[220] ESF EUROCORES Programme Cross-National and Multi-Level Analysis of Human Values, Institutions and Behaviour (HumVIB) Final Report

E. Survey Data

1.1 EUROCORES 1

Q1: Which EUROCORES programme(s) were you were involved in and what was your role?
Answered: 693 Skipped: 43

	Principal Investigator	Project Leader	Associate Partner	Other	Total
BOREAS	**37.1%** 13	**20.0%** 7	**31.4%** 11	**11.4%** 4	35
CNCC	**25.0%** 3	**58.3%** 7	**8.3%** 1	**8.3%** 1	12
ECRP	**50.0%** 25	**18.0%** 9	**28.0%** 14	**4.0%** 2	50
ECT	**20.0%** 1	**0.0%** 0	**40.0%** 2	**40.0%** 2	5
EuroBABEL	**52.6%** 10	**21.1%** 4	**15.8%** 3	**10.5%** 2	19
EuroBioSAS	**66.7%** 6	**0.0%** 0	**11.1%** 1	**22.2%** 2	9
EuroCLIMATE	**30.0%** 6	**40.0%** 8	**20.0%** 4	**10.0%** 2	20
EuroDEEP	**50.0%** 7	**21.4%** 3	**21.4%** 3	**7.1%** 1	14
EuroDIVERSITY	**43.3%** 13	**23.3%** 7	**13.3%** 4	**20.0%** 6	30
EuroDYNA	**23.1%** 3	**53.8%** 7	**15.4%** 2	**7.7%** 1	13
EuroEEFG	**36.0%** 9	**36.0%** 9	**20.0%** 5	**8.0%** 2	25
EuroEPINOMICS	**32.1%** 9	**28.6%** 8	**28.6%** 8	**10.7%** 3	28
EuroGENESIS	**33.3%** 7	**28.6%** 6	**33.3%** 7	**4.8%** 1	21
EuroGIGA	**50.0%** 12	**16.7%** 4	**29.2%** 7	**4.2%** 1	24
EuroGRAPHENE	**31.6%** 6	**42.1%** 8	**15.8%** 3	**10.5%** 2	19
EuroHESC	**55.0%** 11	**15.0%** 3	**25.0%** 5	**5.0%** 1	20
EuroMARC	**40.0%** 8	**30.0%** 6	**25.0%** 5	**5.0%** 1	20
EuroMARGINS	**43.8%** 14	**15.6%** 5	**31.3%** 10	**9.4%** 3	32

E. Survey Data

	Principal Investigator	Project Leader	Associate Partner	Other	Total
EuroMEMBRANE	**54.5%** 12	**31.8%** 7	**4.5%** 1	**9.1%** 2	22
EuroMinScI	**36.0%** 9	**24.0%** 6	**32.0%** 8	**8.0%** 2	25
EuroQUAM	**44.4%** 8	**33.3%** 6	**11.1%** 2	**11.1%** 2	18
EuroQUASAR	**25.0%** 4	**37.5%** 6	**25.0%** 4	**12.5%** 2	16
EuroSCOPE	**28.6%** 4	**14.3%** 2	**42.9%** 6	**14.3%** 2	14
EuroSolarFuels	**54.5%** 6	**18.2%** 2	**18.2%** 2	**9.1%** 1	11
EuroSTELLS	**55.6%** 5	**22.2%** 2	**0.0%** 0	**22.2%** 2	9
EuroSTRESS	**22.2%** 2	**55.6%** 5	**0.0%** 0	**22.2%** 2	9
EuroSYNBIO	**35.7%** 5	**42.9%** 6	**7.1%** 1	**14.3%** 2	14
EuroUnderstanding	**57.1%** 8	**21.4%** 3	**14.3%** 2	**7.1%** 1	14
EuroVOL	**47.4%** 9	**26.3%** 5	**21.1%** 4	**5.3%** 1	19
FANAS	**44.4%** 8	**38.9%** 7	**11.1%** 2	**5.6%** 1	18
FoNE	**41.7%** 5	**41.7%** 5	**8.3%** 1	**8.3%** 1	12
HumVIB	**36.8%** 7	**21.1%** 4	**21.1%** 4	**21.1%** 4	19
Inventing Europe	**41.2%** 7	**17.6%** 3	**29.4%** 5	**11.8%** 2	17
LogICCC	**37.5%** 9	**25.0%** 6	**33.3%** 8	**4.2%** 1	24
OMLL	**35.7%** 5	**42.9%** 6	**14.3%** 2	**7.1%** 1	14
RNAQuality	**72.7%** 8	**18.2%** 2	**0.0%** 0	**9.1%** 1	11
SONS 1	**50.0%** 9	**27.8%** 5	**22.2%** 4	**0.0%** 0	18
SONS 2	**35.7%** 5	**42.9%** 6	**14.3%** 2	**7.1%** 1	14
S3T	**37.5%** 3	**25.0%** 2	**12.5%** 1	**25.0%** 2	8

E. Survey Data

	Principal Investigator	Project Leader	Associate Partner	Other	Total
TECT	**25.0%** 5	**40.0%** 8	**25.0%** 5	**10.0%** 2	20
TOPO-EUROPE	**45.1%** 23	**23.5%** 12	**21.6%** 11	**9.8%** 5	51

Q2: Please tick the box indicating the country where you worked at the time when you contributed to EUROCORES:

Answered: 719 Skipped: 17

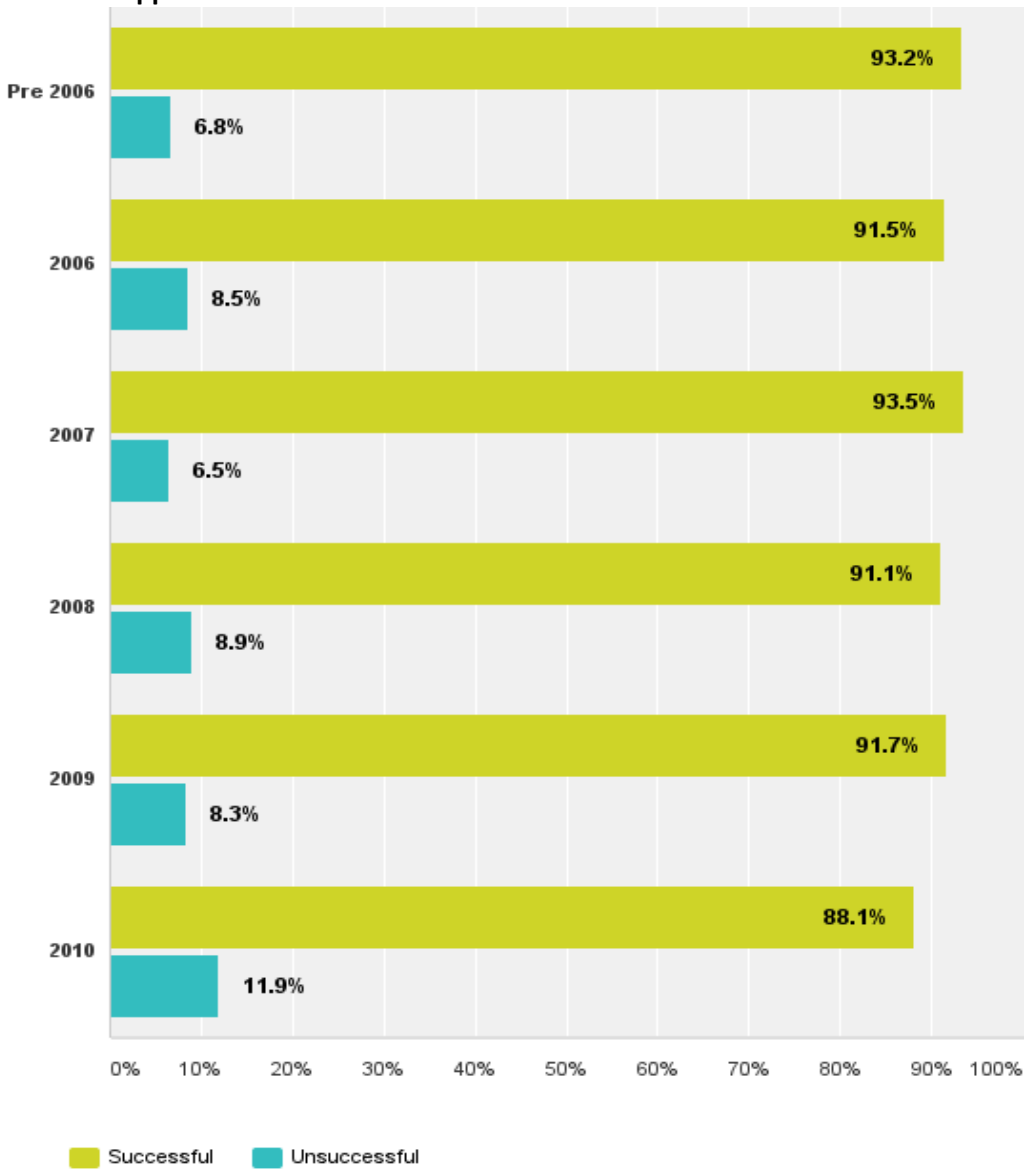
Answer Choices	Responses	
Italy	**6.3%**	45
Austria	**4.5%**	32
Belgium	**3.6%**	26
Bulgaria	**0.1%**	1
Canada	**0.8%**	6
Cyprus	**0.0%**	0
Croatia	**0.3%**	2
Czech Rep.	**2.1%**	15
Denmark	**2.2%**	16
Estonia	**0.6%**	4
Finland	**3.3%**	24
France	**8.3%**	60
Germany	**14.9%**	107
Greece	**0.1%**	1
Hungary	**1.1%**	8
Iceland	**0.0%**	0
Ireland	**1.5%**	11
Israel	**0.1%**	1
Latvia	**0.0%**	0
Lithuania	**0.0%**	0
Luxembourg	**0.3%**	2
Malta	**0.0%**	0
Netherlands	**7.6%**	55
Norway	**2.9%**	21
Poland	**2.2%**	16
Portugal	**1.8%**	13

E. Survey Data

Answer Choices	Responses	
Romania	**0.8%**	6
Slovakia	**0.7%**	5
Slovenia	**0.8%**	6
Spain	**7.0%**	50
Sweden	**4.7%**	34
Switzerland	**5.4%**	39
Turkey	**1.3%**	9
UK	**8.5%**	61
USA	**4.0%**	29
Other	**1.9%**	14
Total		**719**

E. Survey Data

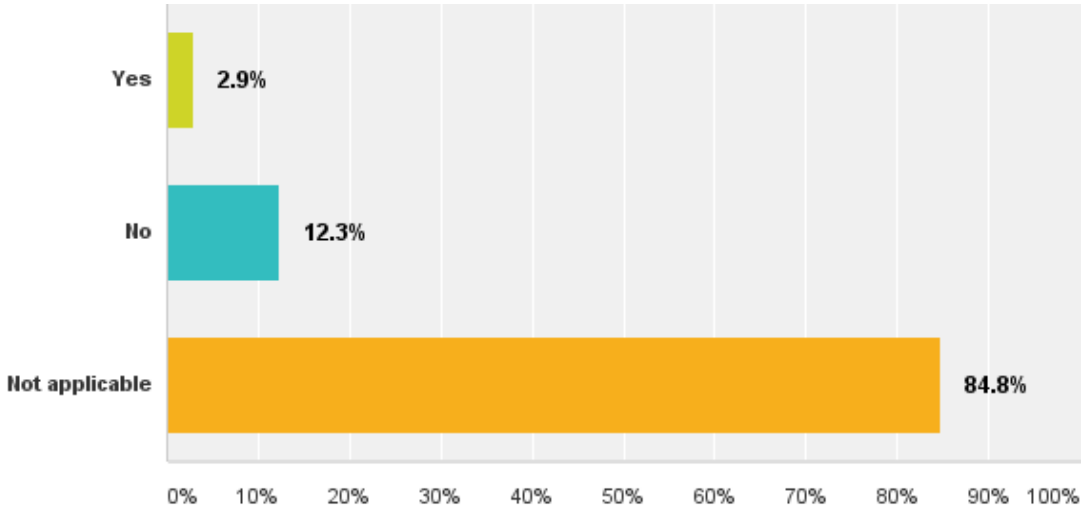
Q3: Please tick the years in which you applied for EUROCORES funding and indicate the outcome:
Answered: 668 Skipped: 68



E. Survey Data

	Successful	Unsuccessful	Total
Pre 2006	**93.2%** 165	**6.8%** 12	177
2006	**91.5%** 108	**8.5%** 10	118
2007	**93.5%** 101	**6.5%** 7	108
2008	**91.1%** 102	**8.9%** 10	112
2009	**91.7%** 100	**8.3%** 9	109
2010	**88.1%** 118	**11.9%** 16	134

Q4: If one or more of your applications was unsuccessful, did you make use of the rebuttal procedure?
Answered: 617 Skipped: 119

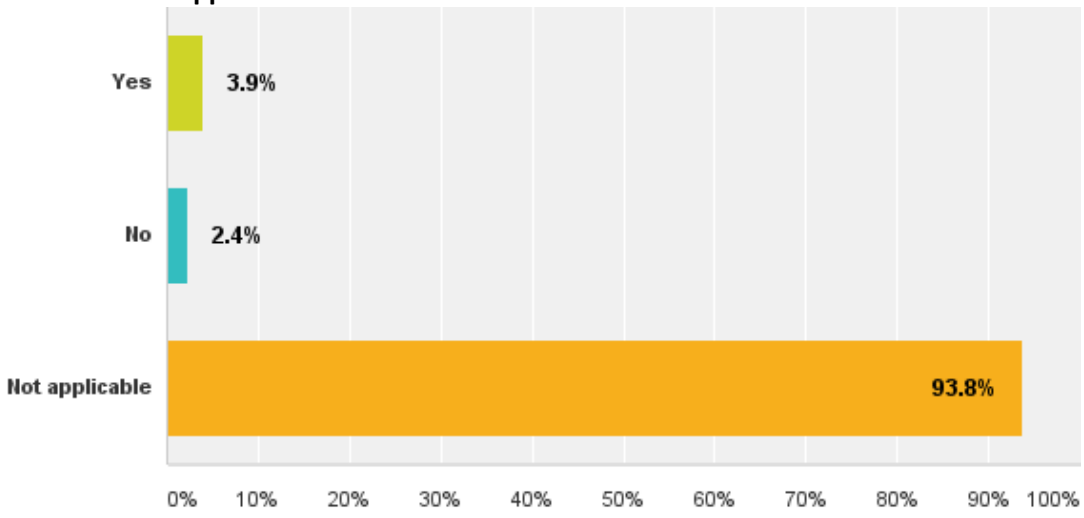


Answer Choices	Responses	
Yes	**2.9%**	18
No	**12.3%**	76
Not applicable	**84.8%**	523
Total		**617**

E. Survey Data

Q5: If you used the rebuttal procedure, did you receive any feedback?

Answered: 592 Skipped: 144

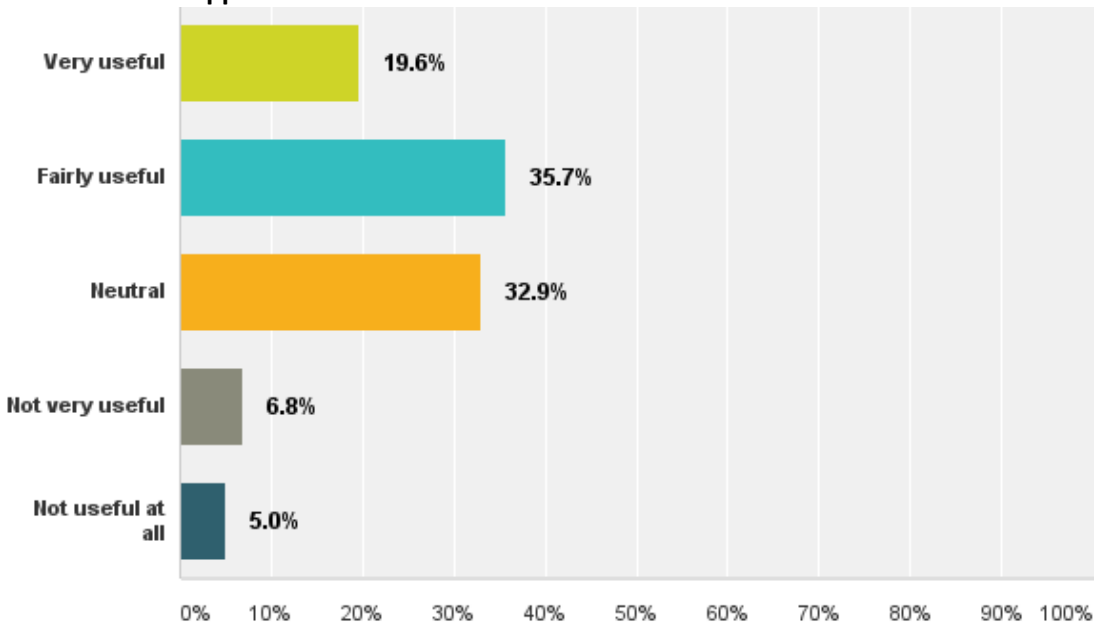


Answer Choices	Responses	
Yes	**3.9%**	23
No	**2.4%**	14
Not applicable	**93.8%**	555
Total		**592**

E. Survey Data

Q6: If you received feedback on your application, how useful was this?

Answered: 322 Skipped: 414

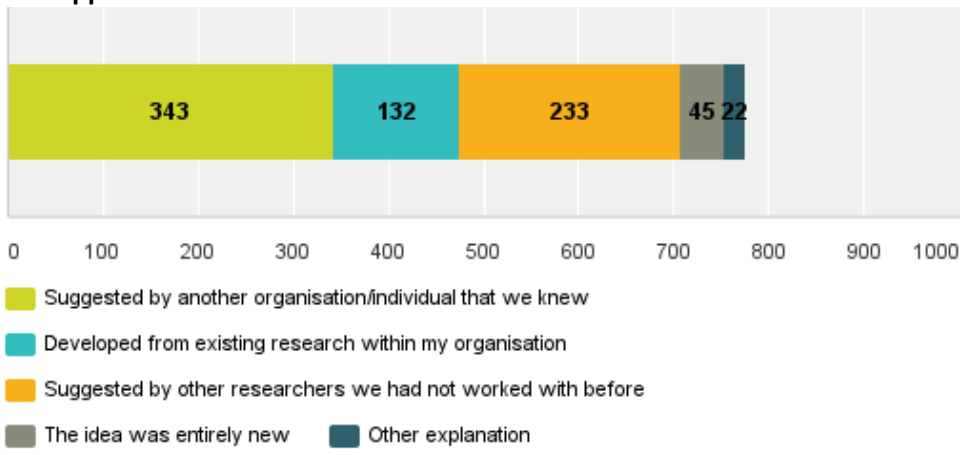


Answer Choices	Responses	
Very useful	**19.6%**	63
Fairly useful	**35.7%**	115
Neutral	**32.9%**	106
Not very useful	**6.8%**	22
Not useful at all	**5.0%**	16
Total		**322**

E. Survey Data

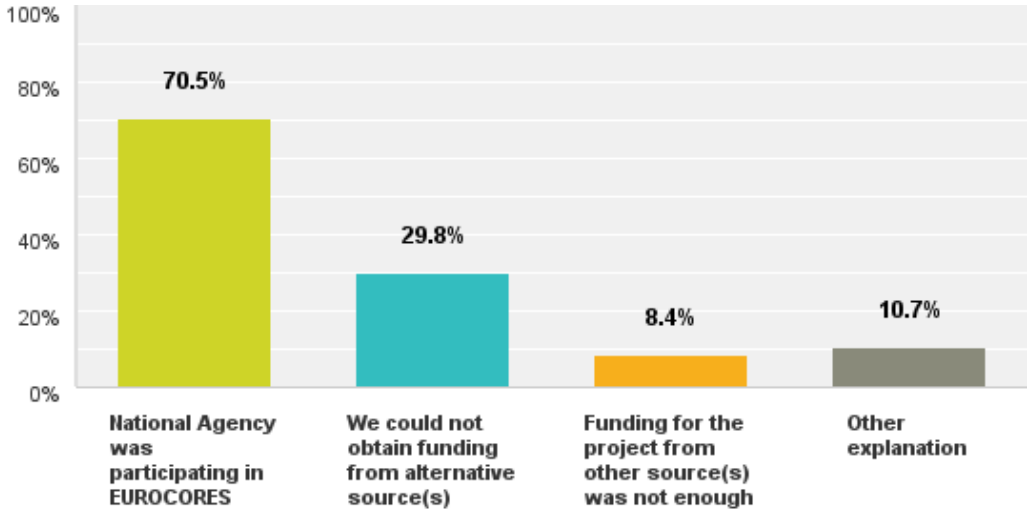
Q7: How did the idea for a Collaborative Research Project originate?

Answered: 670 Skipped: 66



Q8: Why did you decide to apply for support from the EUROCORES scheme? Please tick the appropriate box(es):

Answered: 657 Skipped: 79



E. Survey Data

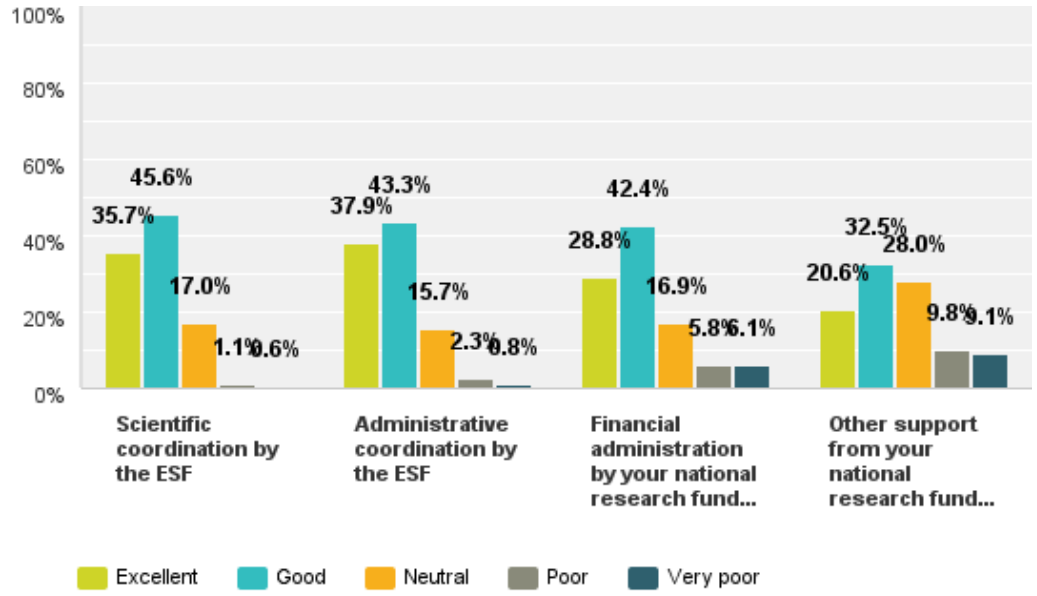
Answer Choices	Responses	
National Agency was participating in EUROCORES	**70.5%**	463
We could not obtain funding from alternative source(s)	**29.8%**	196
Funding for the project from other source(s) was not enough	**8.4%**	55
Other explanation	**10.7%**	70
Total Respondents: 657		

Q9: How would you rate the following aspects of the EUROCORES application procedure:
Answered: 655 Skipped: 81

	Excellent	Good	Neutral	Poor	Very	Total
EUROCORES theme and programme selection via a peer review process	**34.1%** 221	**53.2%** 345	**11.6%** 75	**0.9%** 6	**0.3%** 2	649
Fair and impartial CRP selection process (two-stage peer review process)	**30.3%** 190	**52.5%** 330	**13.4%** 84	**2.9%** 18	**1.0%** 6	628
Rebuttal process	**10.0%** 47	**24.7%** 116	**62.0%** 291	**2.1%** 10	**1.1%** 5	469
Length of time taken to process the CRP application and make a decision	**11.7%** 73	**50.6%** 316	**29.8%** 186	**6.4%** 40	**1.6%** 10	625
Length of time to receive funding agreement	**13.7%** 86	**47.4%** 297	**26.5%** 166	**9.6%** 60	**2.9%** 18	627

E. Survey Data

Q10: How would you rate the following aspects of the EUROCORES administration:
Answered: 663 Skipped: 73

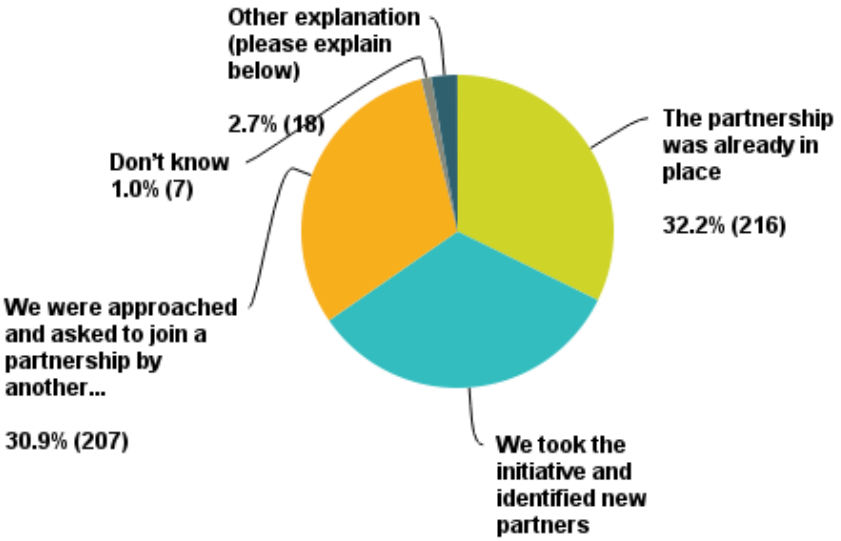


	Excellent	Good	Neutral	Poor	Very poor	Total
Scientific coordination by the ESF	**35.7%** 235	**45.6%** 300	**17.0%** 112	**1.1%** 7	**0.6%** 4	658
Administrative coordination by the ESF	**37.9%** 247	**43.3%** 282	**15.7%** 102	**2.3%** 15	**0.8%** 5	651
Financial administration by your national research funding	**28.8%** 184	**42.4%** 271	**16.9%** 108	**5.8%** 37	**6.1%** 39	639
Other support from your national research funding	**20.6%** 124	**32.5%** 196	**28.0%** 169	**9.8%** 59	**9.1%** 55	603

E. Survey Data

Q11: How did the partnership with organisations/individuals from other countries for the programme originate? Please tick the appropriate boxes:

Answered: 670 Skipped: 66



Answer Choices	Responses	
The partnership was already in place	**32.2%**	216
We took the initiative and identified new partners	**33.1%**	222
We were approached and asked to join a partnership by another organization	**30.9%**	207
Don't know	**1.0%**	7
Other explanation (please explain below)	**2.7%**	18
Total		**670**

E. Survey Data

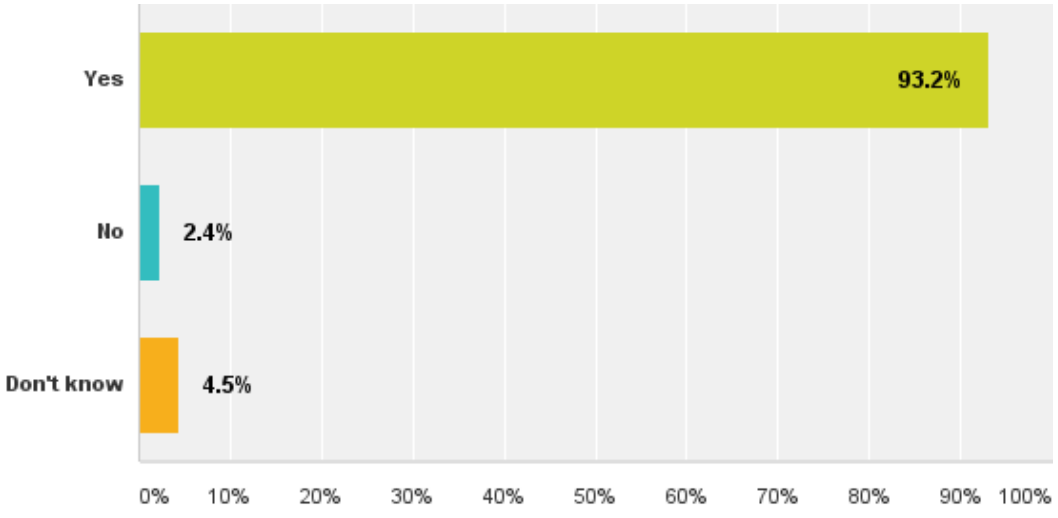
Q12: How well did the partnership with other organisations/individuals work? Please comment on the following aspects:

Answered: 671 Skipped: 65

	Excellent	Good	Neutral	Poor	Very	Total
Generating interdisciplinary scientific insights	**44.8%** 299	**45.0%** 300	**8.1%** 54	**1.6%** 11	**0.4%** 3	667
Stimulating creativity/scientific discovery	**52.0%** 344	**41.2%** 273	**5.0%** 33	**1.5%** 10	**0.3%** 2	662
Achieving research/scientific outcomes	**44.6%** 296	**44.7%** 297	**8.6%** 57	**1.7%** 11	**0.5%** 3	664
Project management and administrative tasks	**23.6%** 155	**48.9%** 321	**22.7%** 149	**4.0%** 26	**0.9%** 6	657
Preparing reports and other deliverable	**24.3%** 160	**52.4%** 345	**19.8%** 130	**3.0%** 20	**0.5%** 3	658
Publicizing of the research outcomes, e.g. conferences	**38.1%** 249	**46.7%** 305	**12.9%** 84	**1.8%** 12	**0.5%** 3	653

Q13: Did the programme bring together an appropriate group of organisations/individuals for this type of initiative?

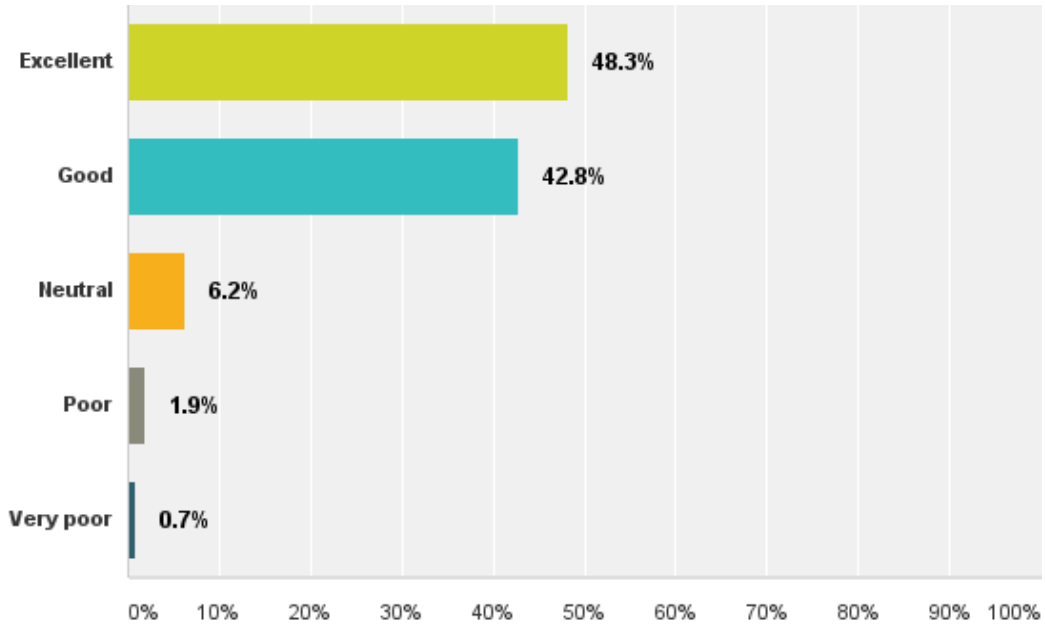
Answered: 674 Skipped: 62



E. Survey Data

Answer Choices	Responses	
Yes	**93.2%**	628
No	**2.4%**	16
Don't know	**4.5%**	30
Total		**674**

Q14: Overall, how would you rate the collaboration between the partners on this programme:
Answered: 673 Skipped: 63



Answer Choices	Responses	
Excellent	**48.3%**	325
Good	**42.8%**	288
Neutral	**6.2%**	42
Poor	**1.9%**	13
Very poor	**0.7%**	5
Total		**673**

E. Survey Data

Q15: To what extent did your programme achieve the following scheme objectives?
Answered: 669 Skipped: 67

	Fully	Partly	Not at all	Don't know	Total
Promoting cooperation between Europe's national funding agencies	**37.7%** 251	**31.2%** 208	**9.3%** 62	**21.8%** 145	666
Using competitive peer review process to identify priority research topics	**38.2%** 251	**39.3%** 258	**5.8%** 38	**16.7%** 110	657
Creating a suitable mechanism for collaborative funding of research in Europe	**50.2%** 329	**36.9%** 242	**5.3%** 35	**7.5%** 49	655
Creating a suitable mechanism to support inter-disciplinary research in non-traditional areas	**45.7%** 300	**34.5%** 226	**6.6%** 43	**13.3%** 87	656
Stimulating research in non-traditional areas	**42.4%** 278	**35.9%** 235	**7.9%** 52	**13.7%** 90	655
Opening new horizons in science	**46.4%** 304	**40.9%** 268	**4.4%** 29	**8.2%** 54	655

Q16: EUROCORES has a number of distinct features and values. Please rate the following aspects of EUROCORES in terms of how important they were to stimulating high quality research:
Answered: 663 Skipped: 73

	Very important	Important	Neutral	Not very important	Not important at all	Total
Investigator led/bottom-up design	**56.7%** 370	**32.4%** 211	**9.2%** 60	**1.5%** 10	**0.2%** 1	652
Networking at the European level	**59.9%** 397	**32.7%** 217	**6.3%** 42	**0.8%** 5	**0.3%** 2	663
Theme selection by scientific community	**48.6%** 319	**37.0%** 243	**11.9%** 78	**1.8%** 12	**0.6%** 4	656
Multi/trans-disciplinary approach	**39.0%** 256	**39.3%** 258	**18.9%** 124	**2.0%** 13	**0.8%** 5	656

E. Survey Data

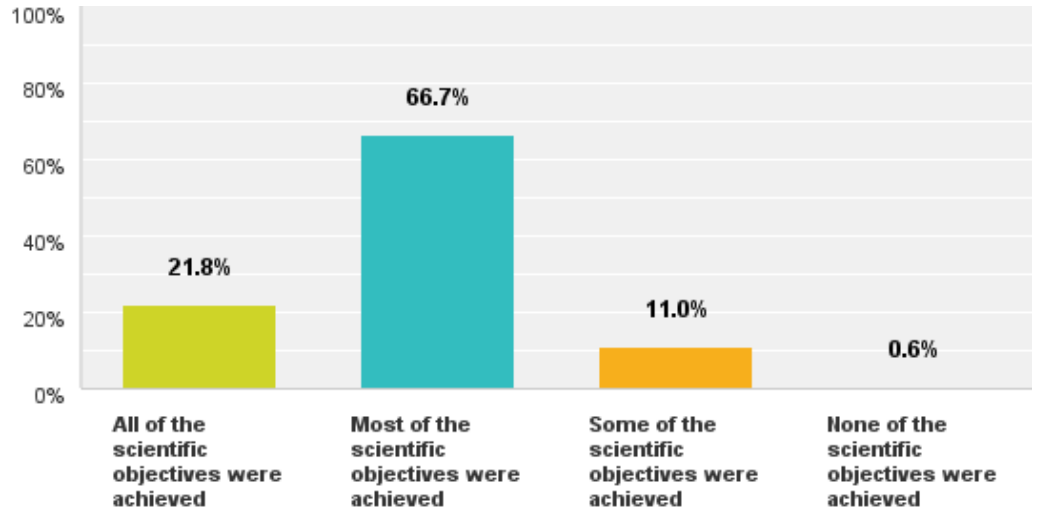
Multiple country research agency involvement	**33.1%** 217	**36.8%** 241	**23.4%** 153	**5.5%** 36	**1.2%** 8	655
Governance by scientific and management committees	**19.3%** 125	**40.7%** 264	**32.2%** 209	**6.0%** 39	**1.8%** 12	649
Independence from national/European political agendas	**48.0%** 314	**30.0%** 196	**17.0%** 111	**3.5%** 23	**1.5%** 10	654
Promote cooperation between Europe's national funding agencies by providing a mechanism for collaborative funding of research on selected priority topics	**38.3%** 248	**38.9%** 252	**18.2%** 118	**3.1%** 20	**1.5%** 10	648

Q17: To what extent were the following aspects of the EUROCORES programme successful?
Answered: 650 Skipped: 86

	Very successful	Fairly successful	Neutral	Fairly unsuccessful	Very unsuccessful	Total
Planning the research activities	**48.1%** 311	**41.4%** 268	**8.5%** 55	**1.7%** 11	**0.3%** 2	647
Undertaking the research collaboratively	**54.5%** 354	**35.9%** 233	**6.3%** 41	**2.6%** 17	**0.6%** 4	649
Achieving technical/ methodological research goals	**41.4%** 266	**43.7%** 281	**12.1%** 78	**2.2%** 14	**0.6%** 4	643
Managing the research partnership	**35.7%** 229	**46.3%** 297	**15.1%** 97	**2.3%** 15	**0.6%** 4	642
Managing the budget	**34.2%** 218	**36.4%** 232	**25.1%** 160	**3.1%** 20	**1.1%** 7	637
Meeting milestones and deadlines	**32.4%** 208	**49.1%** 315	**16.1%** 103	**1.7%** 11	**0.6%** 4	641
Publicising the programme outcomes	**37.3%** 239	**45.9%** 294	**13.3%** 85	**2.7%** 17	**0.8%** 5	640
Other aspects (please explain below)	**22.3%** 35	**21.7%** 34	**54.1%** 85	**1.3%** 2	**0.6%** 1	157

E. Survey Data

Q18: Overall, to what extent did the EUROCORES programme achieve its scientific objectives? Please tick an appropriate box:
Answered: 648 Skipped: 88



Answer Choices	Responses
All of the scientific objectives were achieved	**21.8%**
Most of the scientific objectives were achieved	**66.7%**
Some of the scientific objectives were achieved	**11.0%**
None of the scientific objectives were achieved	**0.6%**
Total	**648**

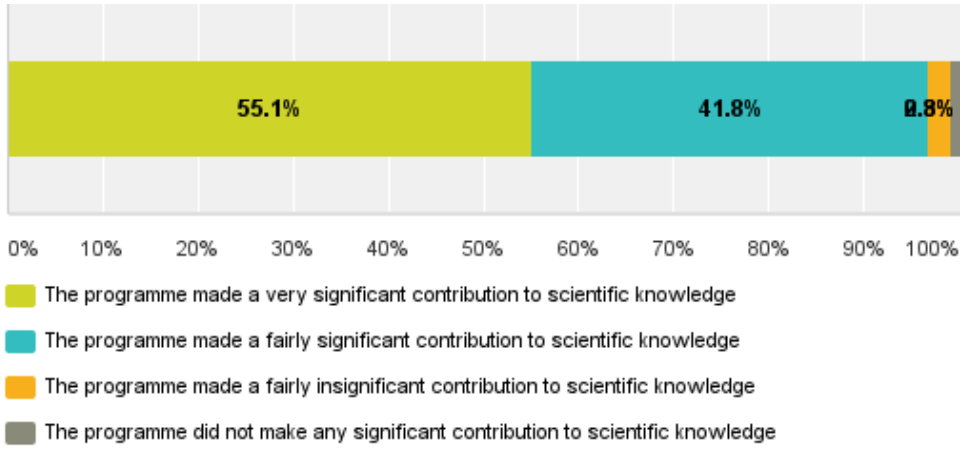
Q19: Overall, to what extent did the EUROCORES programme achieve other non-scientific objectives (e.g. networking, training)? Please tick an appropriate box:
Answered: 638 Skipped: 98

Answer Choices	Responses	
All of the other objectives were achieved	**25.5%**	163
Most of the other objectives were achieved	**58.5%**	373
Some of the other objectives were	**15.2%**	97
None of the other objectives were	**0.8%**	5
Total		**638**

E. Survey Data

Q20: What contribution did the EUROCORES programme make to scientific knowledge? Please tick an appropriate box:

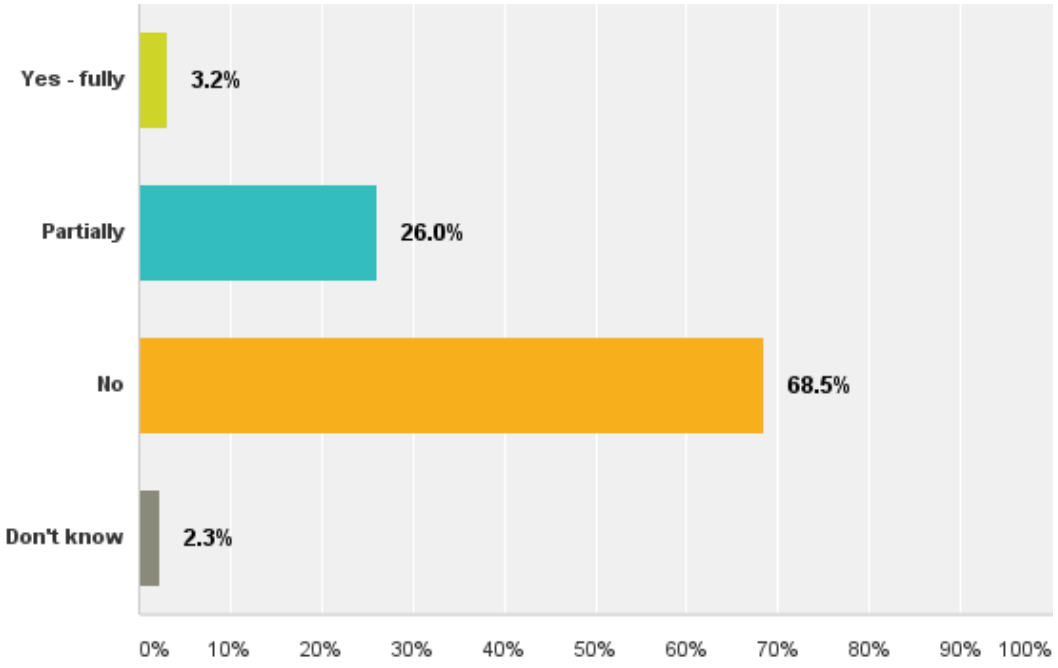
Answered: 643 Skipped: 93



Answer Choices	Responses	
The programme made a very significant contribution to scientific knowledge	**55.1%**	354
The programme made a fairly significant contribution to scientific knowledge	**41.8%**	269
The programme made a fairly insignificant contribution to scientific knowledge	**2.3%**	15
The programme did not make any significant contribution to scientific knowledge	**0.8%**	5
Total		**643**

E. Survey Data

Q21: Could the same programme outcomes have been achieved without the transnational dimension?
Answered: 653 Skipped: 83

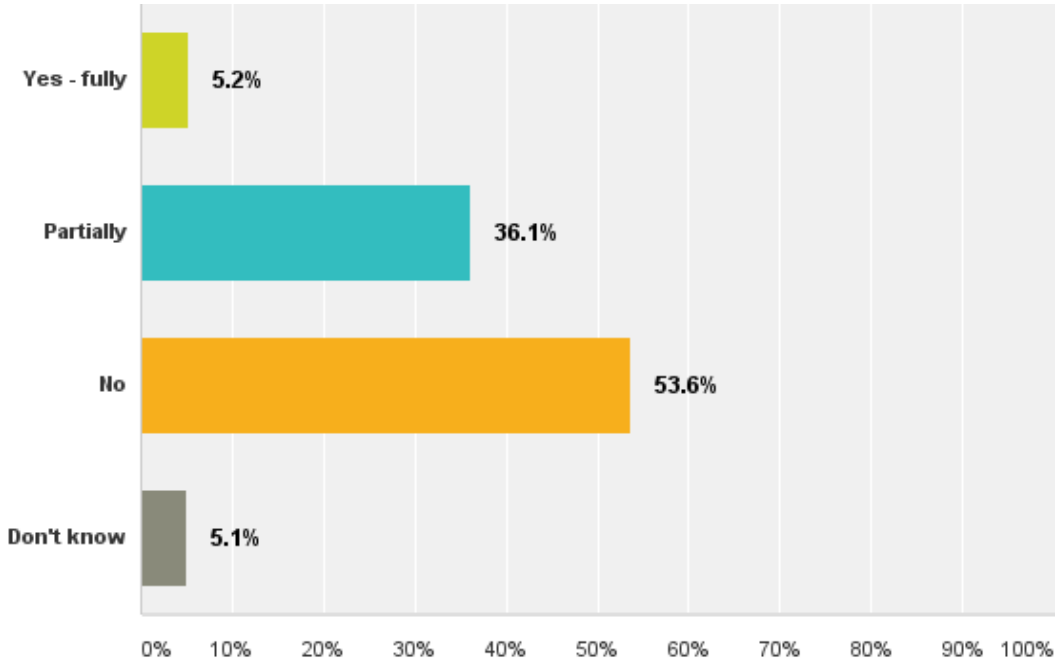


Answer Choices	Responses	
Yes - fully	**3.2%**	21
Partially	**26.0%**	170
No	**68.5%**	447
Don't know	**2.3%**	15
Total		**653**

E. Survey Data

Q22: Could the same programme outcomes have been achieved without the inter-disciplinary dimension?

Answered: 651 Skipped: 85

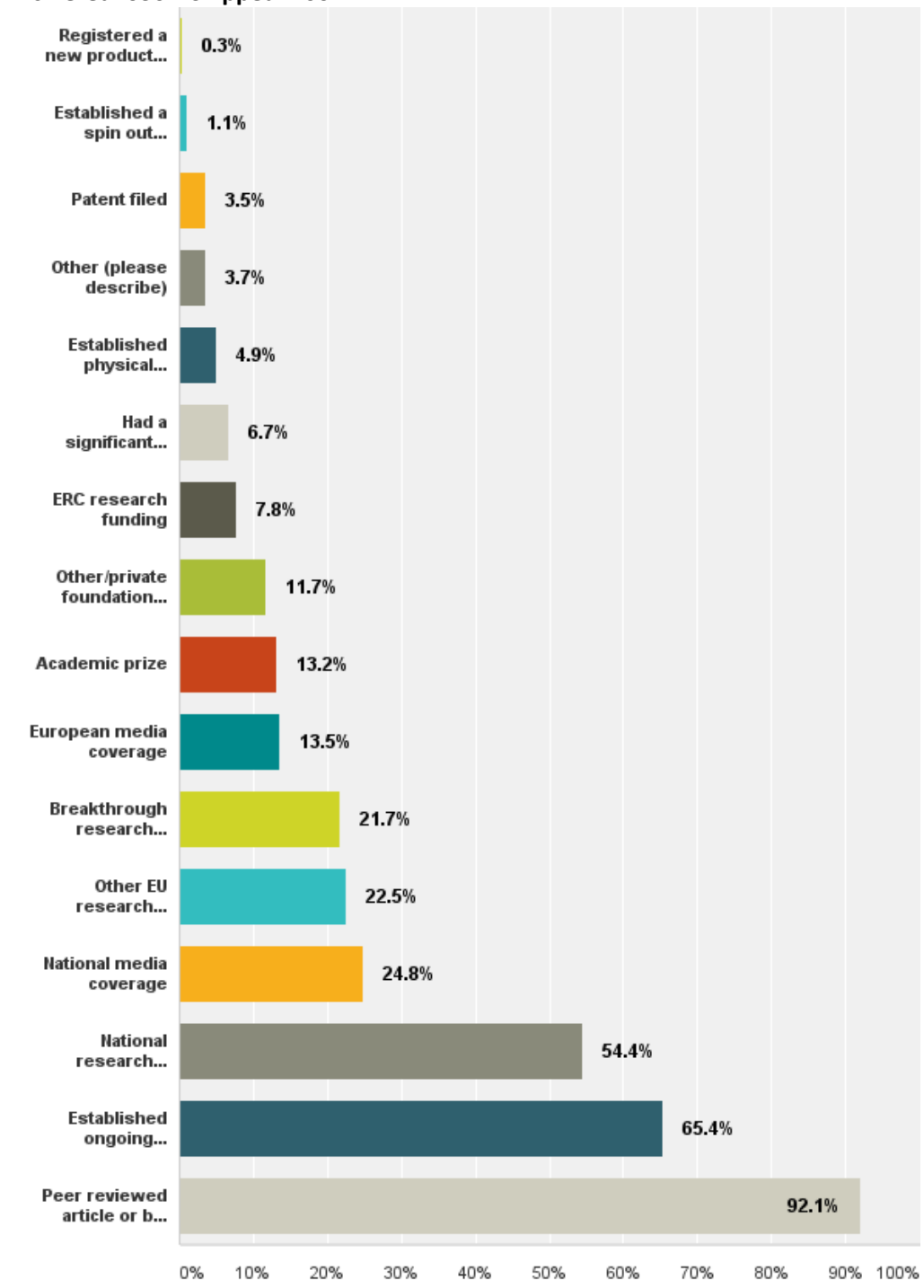


Answer Choices	Responses	
Yes - fully	**5.2%**	34
Partially	**36.1%**	235
No	**53.6%**	349
Don't know	**5.1%**	33
Total		**651**

E. Survey Data

Q23: Since completion of your EUROCORES programme, which (if any) of the following outcomes have been achieved and are attributable to your participation in EUROCORES? Please tick the appropriate box(es):

Answered: 630 Skipped: 106



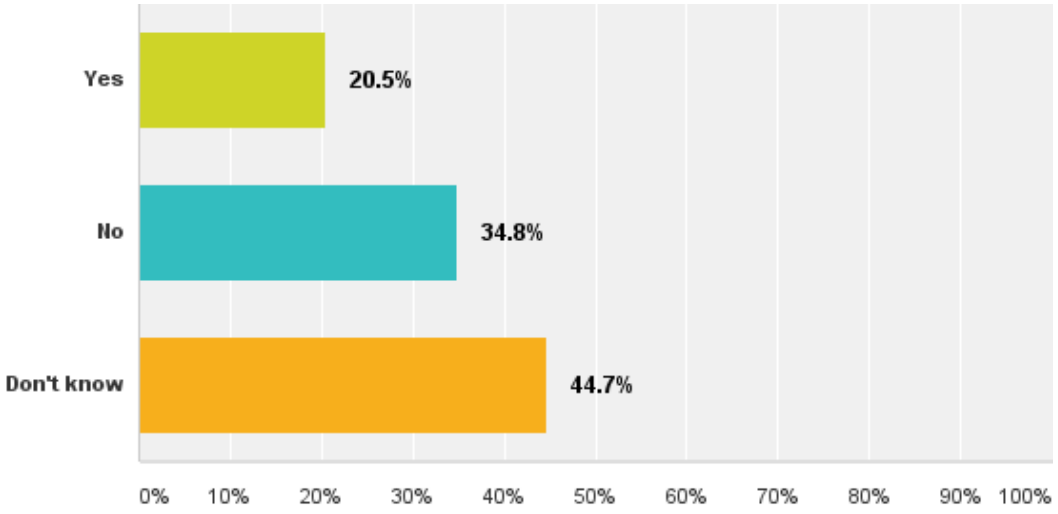
E. Survey Data

Answer Choices	Responses	
Registered a new product license	**0.3%**	2
Established a spin out commercial venture/activity	**1.1%**	7
Patent filed	**3.5%**	22
Other (please describe)	**3.7%**	23
Established physical research facility/centre	**4.9%**	31
Had a significant impact on policy and/or changes in practice	**6.7%**	42
ERC research funding	**7.8%**	49
Other/private foundation research funding	**11.7%**	74
Academic prize	**13.2%**	83
European media coverage	**13.5%**	85
Breakthrough research discovery	**21.7%**	137
Other EU research funding	**22.5%**	142
National media coverage	**24.8%**	156
National research funding	**54.4%**	343
Established ongoing research networks/partnerships	**65.4%**	412
Peer reviewed article or book chapter	**92.1%**	580
Total Respondents: 630		

E. Survey Data

Q24: Do you think you would have achieved the same research outcomes under another pan-European funding programme?

Answered: 653 Skipped: 83



Answer Choices	Responses	
Yes	**20.5%**	134
No	**34.8%**	227
Don't know	**44.7%**	292
Total		**653**

E. Survey Data

Q25: If you answered yes to the last question, please rate how well the following would have enabled the same/very similar outcomes:
Answered: 186 Skipped: 550

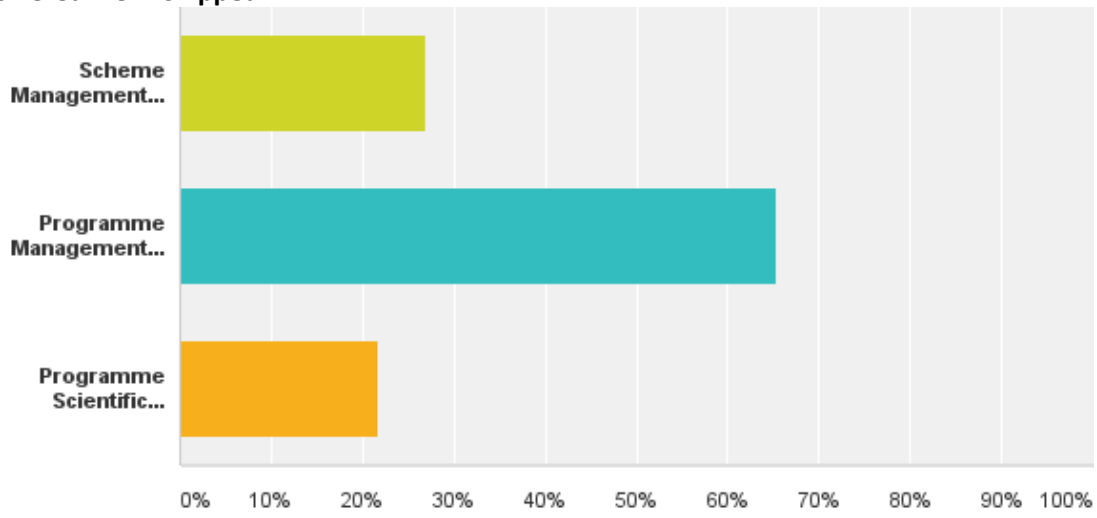
	Very well	Fairly well	Fairly poorly	Very poorly	Total
ERA-NETs	**17.7%** 20	**38.1%** 43	**29.2%** 33	**15.0%** 17	113
COST (European Cooperation in Science and Technology)	**14.6%** 20	**31.4%** 43	**35.8%** 49	**18.2%** 25	137
FP7 (or equivalent Commission funding)	**43.0%** 74	**37.2%** 64	**13.4%** 23	**6.4%** 11	172
Other (please specify)	**36.4%** 4	**36.4%** 4	**9.1%** 1	**18.2%** 2	11

E. Survey Data

1.2 EUROCORES 2

Q1 What was your role in the EUROCORES Scheme? Please tick the relevant box(es) below:

Answered: 78 Skipped: 41



Answer Choices	Responses	
Scheme Management Committee	**26.92%**	21
Programme Management Committee	**65.38%**	51
Programme Scientific Committee	**21.79%**	17
Total Respondents: 78		

E. Survey Data

Q2: Please tick the box indicating the country where you worked at the time when you contributed to the EUROCORES:

Answered: 115 Skipped: 4

Answer Choices	Responses	
Austria	**10.43%**	12
Belgium	**2.61%**	3
Bulgaria	**1.74%**	2
Canada	**0.87%**	1
Cyprus	**0.87%**	1
Croatia	**0.87%**	1
Czech Rep.	**0.87%**	1
Denmark	**4.35%**	5
Estonia	**2.61%**	3
Finland	**4.35%**	5
France	**7.83%**	9
Germany	**2.61%**	3
Greece	**0.00%**	0
Hungary	**0.87%**	1
Iceland	**0.00%**	0
Ireland	**2.61%**	3
Israel	**0.87%**	1
Italy	**2.61%**	3

E. Survey Data

Answer Choices	Responses	
Latvia	**0.00%**	0
Lithuania	**0.87%**	1
Luxembourg	**0.00%**	0
Malta	**0.87%**	1
Netherla	**7.83%**	9
Norway	**4.35%**	5
Poland	**3.48%**	4
Portugal	**3.48%**	4
Romania	**0.87%**	1
Slovakia	**4.35%**	5
Slovenia	**0.00%**	0
Spain	**7.83%**	9
Sweden	**5.22%**	6
Switzerland	**3.48%**	4
Turkey	**4.35%**	5
UK	**4.35%**	5
USA	**1.74%**	2
Other	**0.00%**	0
Total		**115**

E. Survey Data

Q3: Please rate EUROCORES in terms of how well it performed against the following objectives:
Answered: 92 Skipped: 27

	Very well	Well	Neutral	Poorly	Very poorly	Total
Promoting cooperation between Europe's national funding agencies	**22.83%** 21	**52.17%** 48	**14.13%** 13	**8.70%** 8	**2.17%** 2	92
Using competitive peer review process to identify priority research	**24.44%** 22	**46.67%** 42	**22.22%** 20	**5.56%** 5	**1.11%** 1	90
Creating a suitable mechanism for collaborative funding of research in Europe	**20.65%** 19	**51.09%** 47	**14.13%** 13	**10.87%** 10	**3.26%** 3	92
Creating a suitable mechanism for supporting inter-disciplinary research in non-traditional	**16.30%** 15	**41.30%** 38	**33.70%** 31	**7.61%** 7	**1.09%** 1	92
Stimulating research in non-traditional areas	**13.04%** 12	**28.26%** 26	**44.57%** 41	**13.04%** 12	**1.09%** 1	92
Opening new horizons in science	**16.48%** 15	**30.77%** 28	**40.66%** 37	**8.79%** 8	**3.30%** 3	91

Q4: EUROCORES has a number of distinct features and values. Please rate the following aspects of EUROCORES in terms of how important they were to stimulating high quality research:
Answered: 92 Skipped: 27

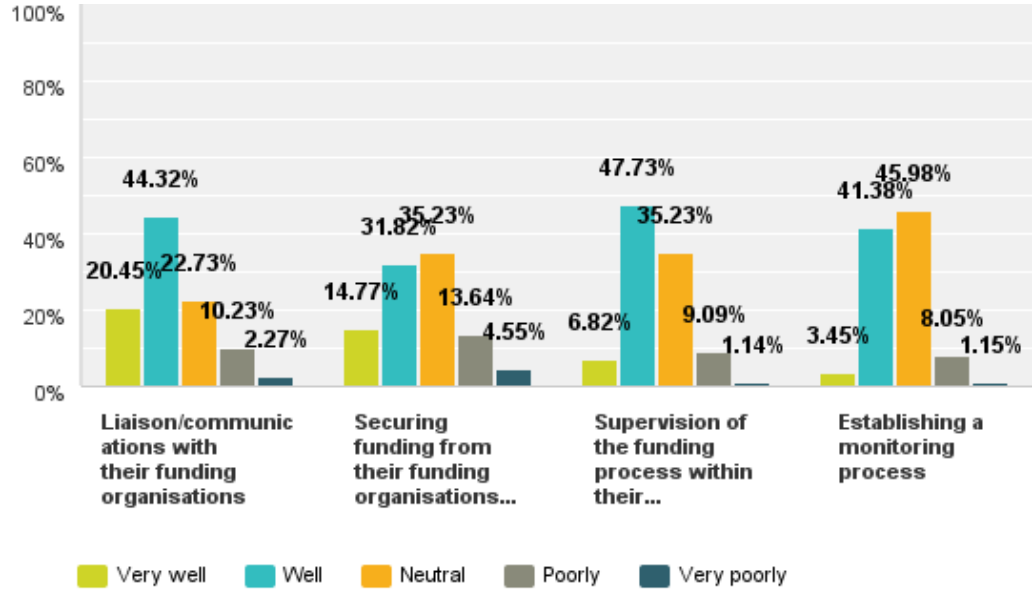
	Excellent	Good	Neutral	Poor	Very poor	Total
Investigator led/bottom-up design	**34.07%** 31	**46.15%** 42	**15.38%** 14	**3.30%** 3	**1.10%** 1	91
Networking at the European level	**40.22%** 37	**46.74%** 43	**10.87%** 10	**1.09%** 1	**1.09%** 1	92
Theme selection by scientific community	**29.35%** 27	**45.65%** 42	**19.57%** 18	**4.35%** 4	**1.09%** 1	92
Multi/trans-disciplinary approach	**19.57%** 18	**48.91%** 45	**26.09%** 24	**3.26%** 3	**2.17%** 2	92
Multiple country research agency involvement	**17.39%** 16	**53.26%** 49	**22.83%** 21	**4.35%** 4	**2.17%** 2	92
Governance by management committees	**15.38%** 14	**37.36%** 34	**37.36%** 34	**8.79%** 8	**1.10%** 1	91

E. Survey Data

Independence from national/European political agendas	**26.37%** 24	**37.36%** 34	**27.47%** 25	**5.49%** 5	**3.30%** 3	91
Promote cooperation between Europe's national funding agencies by providing a mechanism for collaborative funding of research on selected priority topics.	**20.88%** 19	**45.05%** 41	**19.78%** 18	**9.89%** 9	**4.40%** 4	91

Q5: The EUROCORES programme management committees had a number of responsibilities. How well did the following aspects of the arrangement work?

Answered: 88 Skipped: 31

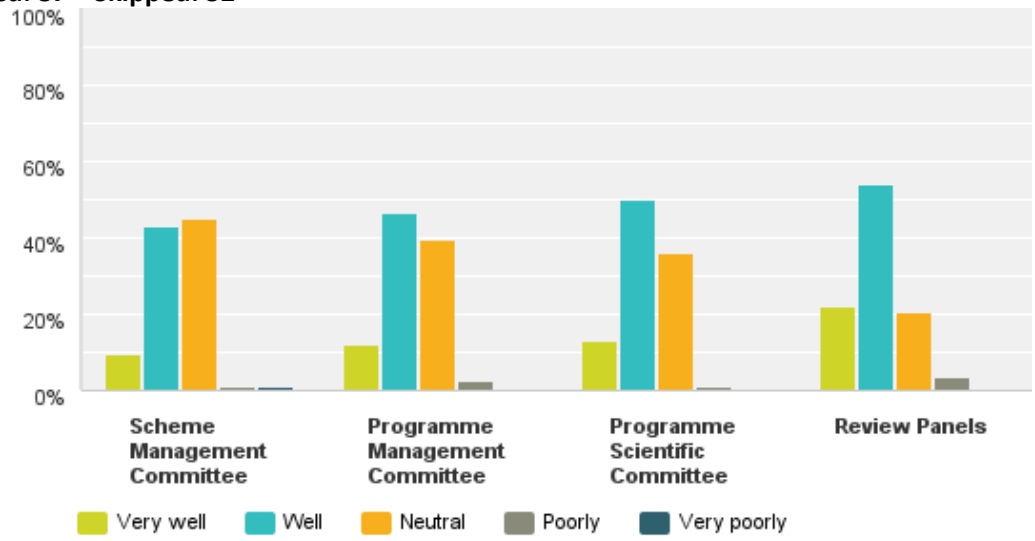


	Very well	Well	Neutral	Poorly	Very poorly	Total
Liaison/communications with their funding organizations	**20.45%** 18	**44.32%** 39	**22.73%** 20	**10.23%** 9	**2.27%** 2	88
Securing funding from their funding organizations at the	**14.77%** 13	**31.82%** 28	**35.23%** 31	**13.64%** 12	**4.55%** 4	88
Supervision of the funding process within their organizations	**6.82%** 6	**47.73%** 42	**35.23%** 31	**9.09%** 8	**1.14%** 1	88
Establishing a monitoring process	**3.45%** 3	**41.38%** 36	**45.98%** 40	**8.05%** 7	**1.15%** 1	87

E. Survey Data

Q6: Overall, how well did the following EUROCORES committees perform in fulfilling their remit? Please rate each of them:

Answered: 87 Skipped: 32

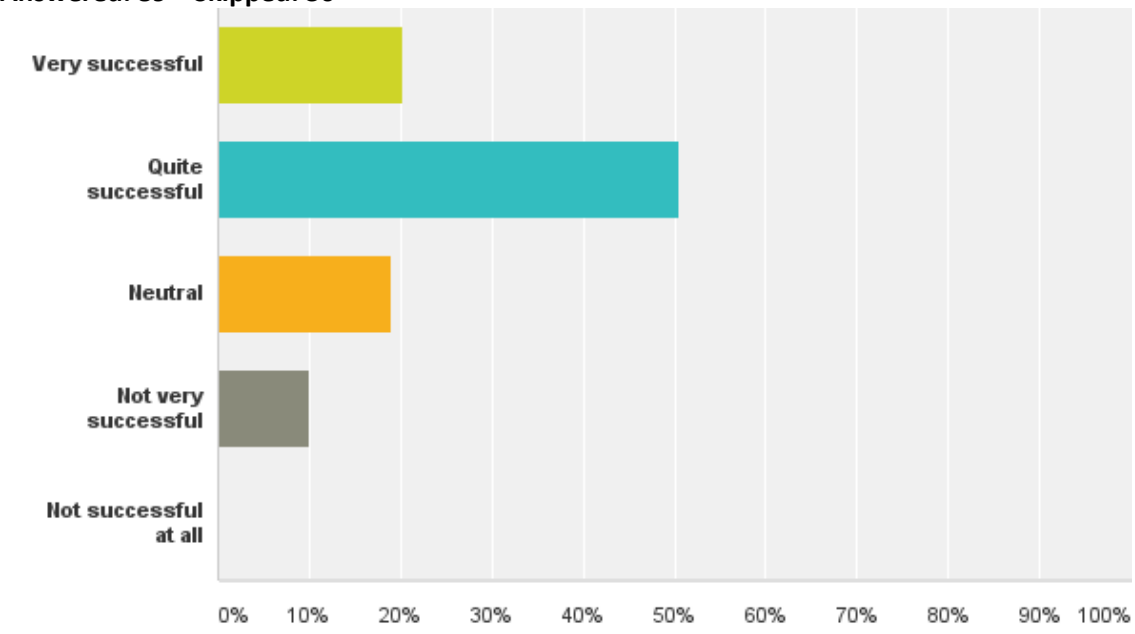


	Very well	Well	Neutral	Poorly	Very poorly	Total
Scheme Management Committee	**9.52%** 8	**42.86%** 36	**45.24%** 38	**1.19%** 1	**1.19%** 1	84
Programme Management Committee	**11.90%** 10	**46.43%** 39	**39.29%** 33	**2.38%** 2	**0.00%** 0	84
Programme Scientific Committee	**12.79%** 11	**50.00%** 43	**36.05%** 31	**1.16%** 1	**0.00%** 0	86
Review Panels	**21.84%** 19	**54.02%** 47	**20.69%** 18	**3.45%** 3	**0.00%** 0	87

E. Survey Data

Q7: Overall, how successful has the EUROCORES scheme been in promoting collaborative research in Europe and beyond?

Answered: 89 Skipped: 30

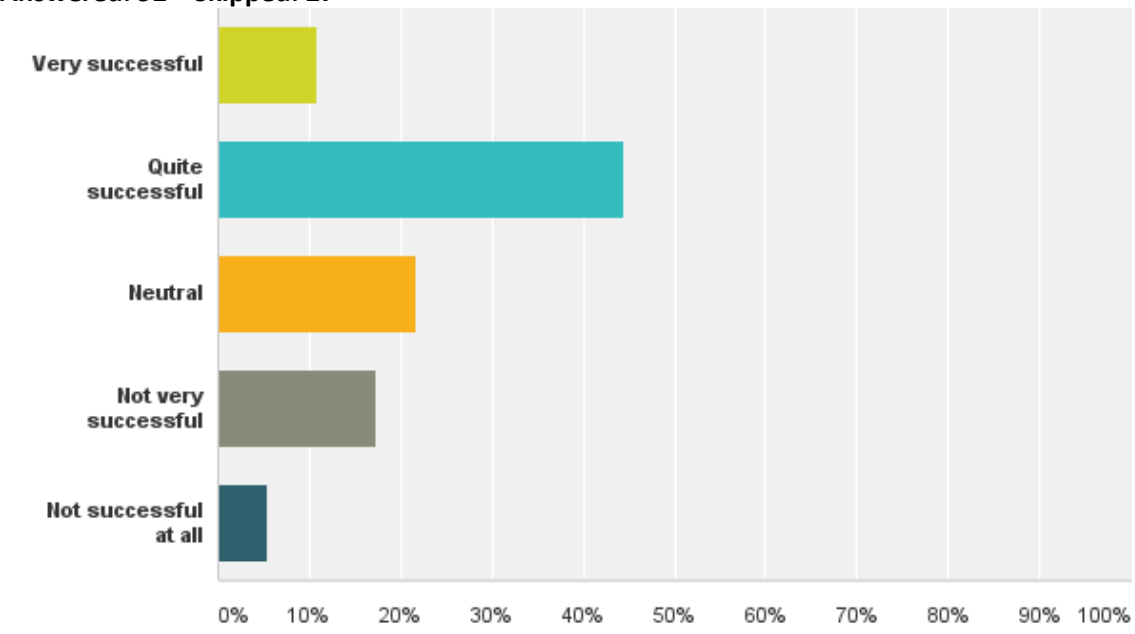


Answer Choices	Responses	
Very successful	**20.22%**	18
Quite successful	**50.56%**	45
Neutral	**19.10%**	17
Not very successful	**10.11%**	9
Not successful at all	**0.00%**	0
Total		**89**

E. Survey Data

Q8: Overall, how successful has the EUROCORES scheme been in promoting co-operation between research funding agencies in Europe and beyond?

Answered: 92 Skipped: 27

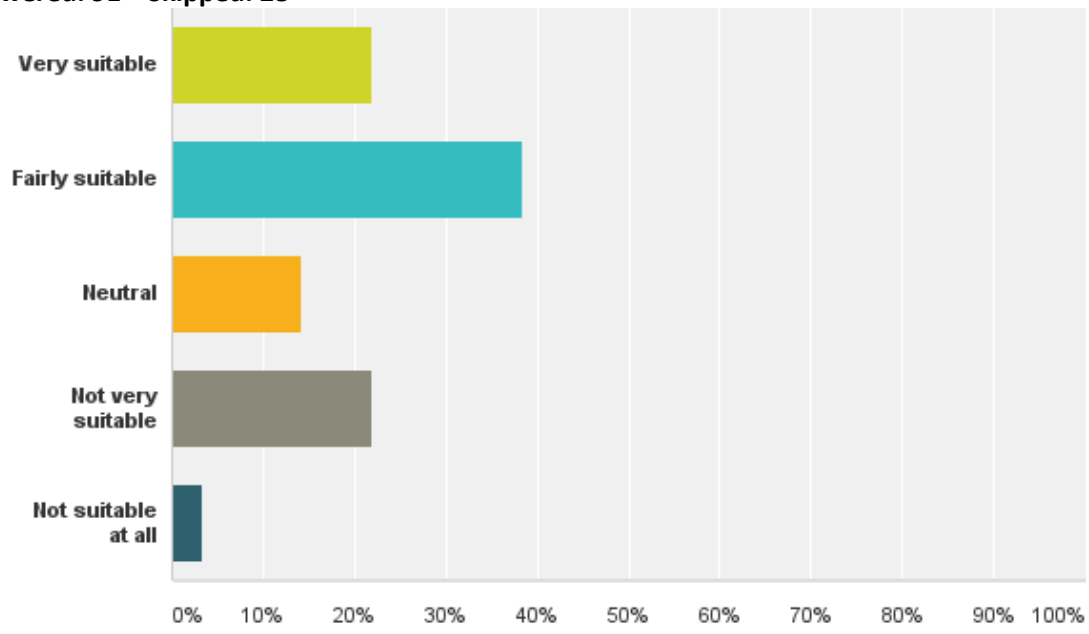


Answer Choices	Responses	
Very successful	**10.87%**	10
Quite successful	**44.57%**	41
Neutral	**21.74%**	20
Not very successful	**17.39%**	**16**
Not successful at all	**5.43%**	5
Total		**92**

E. Survey Data

Q9: To what extent do you think EUROCORES is a suitable mechanism for fostering co-operation between research agencies in the future?

Answered: 91 Skipped: 28

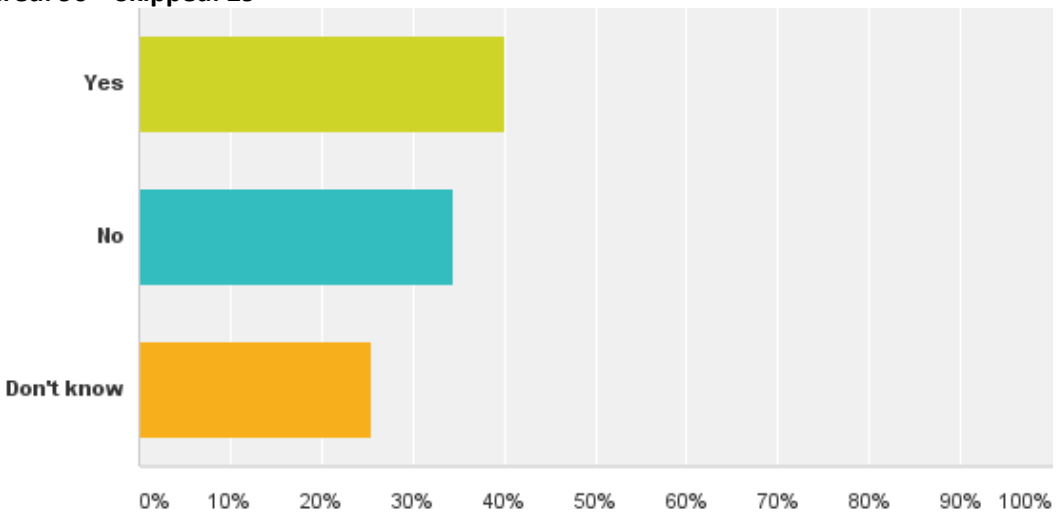


Answer Choices	Responses	
Very suitable	**21.98%**	20
Fairly suitable	**38.46%**	35
Neutral	**14.29%**	13
Not very suitable	**21.98%**	20
Not suitable at all	**3.30%**	3
Total		**91**

E. Survey Data

Q10: The EUROCORES scheme is being brought to an end. Do you think this decision to terminate the scheme was wise?

Answered: 90 Skipped: 29



Answer Choices	Responses	
Yes	**40.00%**	36
No	**34.44%**	31
Don't know	**25.56%**	23
Total		**90**