The Research Council of Norway

Evaluation of Added Value and Financial Aspects

The Norwegian Centre of Excellence Scheme

Evaluation
Division for Science

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Preface

This evaluation of the Norwegian scheme for Centres of Excellence (CoE) was commissioned by the Research Council of Norway (RCN). The purpose is to provide insight that may improve the scheme before the next call for CoE proposals. It is a preliminary evaluation of the added value and financial aspects of the funding scheme, and does not study the scientific impact or success of individual CoEs. The Terms of Reference for the evaluation are found in Appendix 2.

The members of the evaluation team were Siri Brorstad Borlaug, Magnus Gulbrandsen and Liv Langfeldt (project leader). Hebe Gunnes assisted with the NIFU STEP R&D statistics.

We are grateful to the many persons who contributed to this evaluation in response to questionnaires and/or interviews, and who took the time to share their experiences and insight with us, including CoE directors, board members, research fellows and partners, representatives of the CoE host institutions, finalists in the CoE competition, representatives of RCN and its review panels. Thanks to Gro Helgesen, Ingrid Sogner and Lars Walløe for helpful comments on the project plans and the draft report.

Oslo, August 2010

Sveinung Skule
Director

Taran Thune
Head of Research

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Sammendrag (Norwegian Summary)

Den norske ordningen med Sentre for fremragende forskning (SFF) skal fremme grunnleggende forskning på høyt internasjonalt nivå ved hjelp av romslig, langsiktig finansiering, samt styrke internasjonalisering og forskerutdanning. De første sentrene ble etablert i 2003 og ordningen omfatter i dag 21 sentre.

Hovedformålet med evalueringen er å bidra til kunnskap om hvordan SFF-ordningen fungerer og gi grunnlag for å vurdere eventuelle endringer i ordningens rammebetingelser i forkant av neste utlysning. Evalueringens mandat ber om analyser av senterordningens merverdi og hvordan finansieringen fungerer. Vurderingene er basert på intervjuer med berørte aktører (bl.a. sentrenes vertsinstitusjoner), spørreskjema til de 21 SFFene og 18 "SFF-finalister" fra forrige søknadsrunde (2006), samt diverse bakgrunnsdokumentasjon og nasjonal statistikk. Det understrekes at evalueringen er avgrenset og foreløpig. Den første SFF-perioden er ennå ikke avsluttet, og verken de enkelte sentrene eller deres forskning evalueres.

Merverdi og varige effekter

Hovedinntrykket av ordningen er svært positivt. Spesielt har ordningen lykkes i å fremme forskerrekruttering og i å forsterke internasjonaliseringen av norsk forskning. Den har også bidratt til mer nasjonalt og tverrfaglig samarbeid.

Langsiktig rundsum-finansiering er ifølge informantene en viktig forutsetning for sentrenes suksess. SFF-finansieringen muliggjør oppbygging av sterke forskningsmiljøer og rekruttering av høyt kvalifiserte forskere. Internasjonalisering styrkes gjennom finansiering av internasjonale prosjekter, seniorforskere i bistillinger, gjesteforskere og bedre reisebudsjetter. Alle sentrene oppgir at de bidrar mer enn før til å gjøre norsk forskning internasjonalt synlig.

Statusen som "fremragende" er også viktig for sentrene. Å bygge opp et forskningsmiljø er sentralt i SFF-ordningen, og SFF-statusen er viktig for å oppnå både lokal og ekstern støtte i etableringsfasen. Statusen bidrar til å sikre tilleggsfinansiering og tiltrekker høyt kvalifiserte forskere og partnere. Enkelte informanter var kritiske til hvordan SFFene ble plukket ut, men dette synes ikke å påvirke ordningens status.

Datamaterialet indikerer at SFF-ordningen har forsterket konkurransen mellom norske forskningsmiljøer, og den vil trolig ha varige effekter på arbeidsdelingen mellom norske universiteter. Ordningen har gitt høyere ambisjoner og mål både for de involverte gruppene og for andre som prøver å oppnå SFF-status. Også økt internasjonalisering og "internasjonale" PhD-studenter som bygger opp sin karriere i andre land, men bevarer sterke bånd til norsk forskning, vil trolig gi varige effekter.

Det er betydelige forskjeller mellom forskningsinstituttene og universitetene i hva det gir å være vertsinstitusjon for en SFF. Merverdien er større for forskningsinstituttene enn for universitetene når det gjelder økning i internasjonalt forskningssamarbeid og involvering i doktorgradsutdanning. På den annen side er merverdien større for universitetene enn for forskningsinstituttene når det gjelder effekt på forskningsadministrasjon og strategiarbeid. På universitetene har SFFene gitt økt oppmerksomhet om, og "tvungen" læring i, forskningsorganisering og ledelse. For instituttene har SFF-ordningen hatt liten effekt i dette henseende, først og fremst fordi de ikke har de samme administrative utfordringene.

Analysen indikerer at samlokalisering av de involverte forskerne har synergieffekter og bidrar til bedre samarbeid og et mer dynamisk miljø. Det er verd å merke seg at noen av sentrene som ikke er samlokalisert, oppgir mindre internasjonale effekter enn de samlokaliserte sentrene. Sentrene har imidlertid ulike behov, og i noen tilfeller kan samlokalisering være kontraproduktivt.

Økonomisk suksess og hardere konkurranse

SFFene har mer ekstern finansiering og generelt romsligere økonomi enn de fleste andre forskningsgrupper. SFF-bevilgningen fra Forskningsrådet står i gjennomsnitt bare for 20 prosent av sentrenes totale inntekter. Verstinstitusjonens medfinansiering står i snitt for 24 prosent, andre bevilgninger fra Forskningsrådet 17 prosent og annen ekstern finansiering for nærmere 35 prosent. SFF-ordningen innebærer dermed betydelig akkumulering av fordeler for sentrene, både i form av finansiering og forskerressurser. Dette er ikke nødvendigvis urimelige fordeler, og vi har ikke funnet belegg for at andre forskere på de berørte forskningsområdene kommer generelt dårligere ut på grunn av SFFene. Jevnt over er verstinstitusjonenes medfinansiering av SFFene lavere enn den normale basisfinansieringen innen faget. I de fleste tilfeller er andelen som er finansiert av Forskningsrådet, heller ikke større enn gjennomsnittet for faget.

SFFene innebærer imidlertid hardere konkurranse om vertsinstitusjonenes ressurser og i noen tilfeller reduserte ressurser for andre forskningsgrupper. Informanter ved rundt halvparten av de involverte institusjonelle enhetene mente at institusjonens medfinansiering innebar reduserte resurser for andre grupper på institusjonen. I to tilfeller ble det sagt at den økonomiske nettoeffekten på de lokale omgivelsene var positiv.

SFFene har en stor del av doktorgradsstudentene på mange av de relevante forskningsområdene. De står også for en stor del av senior- og forskerstillinger i flere fag. Dette tilsier at SFFene har effekt på dagens ressursfordeling, at de vil kunne få varige effekter på de involverte forskningsfeltene, samt betydelig effekter på tilgrensende forskningsfelt – særlig på felt hvor det er få talenter. Samtidig kan noen sentre fortelle at de ved hjelp av sin SFF-status har klart å tiltrekke seg personer som ellers ville ha gått til næringslivet/en ikke-akademisk karriere, og at de slik kan ha hatt en positiv nettoeffekt på rekruttering.

Lokale spenninger, institusjonell læring og nasjonalt samarbeid

I vertsinstitusjonenes ledelse gis SFFene – og "excellence" mer generelt – høy prioritet. SFF-ordningen krever ekstra organisering og administrasjon, men vertsinstitusjonene tar godt imot sentrene og mener at de er verd den ekstra innsatsen. Det er likevel en del eksempler på motsetningsfylte forhold og stridigheter mellom SFFene og (andre miljøer ved) vertsinstitusjonene. Slike motsetninger bunner blant annet i frikjøp fra undervisnings-plikter, sentre som oppfattes å forstyrre balansen mellom faglige prioriteringer, mer personlige forhold og begrenset evne/mulighet til ledelse.

Analysene indikerer at et godt forhold til vertsinstitusjonen er viktig for sentrene. Sentre med gode relasjoner rapporter økning i lokalt, nasjonalt og tverrfaglig samarbeid, og også økt samarbeid med næringslivet. Der det er motsetningsfylte relasjoner til verts-institusjonen er effekten på slikt samarbeid mindre. I intervjuene med SFF-lederne framkom det dessuten at holdingene i ledelsen ved "morinstituttet" har vært viktige når det gjelder å bidra til lokalt samarbeid og integrering i det lokale forskningsmiljøet. Ved flere institusjoner er det igangsatt "integreringstiltak" som svar på kritikk av SFFer som isolerte, autonome enheter. At de første sentrene nå nærmer seg avslutningsfasen og planlegger sin framtid uten SFF-status og -finansiering, motiverer også bedre tilknyting til det lokale forskningsmiljøet.

Informantene fremhever at SFFene har hatt positive effekter på universitetenes evne til å prioritere og organisere forskning, og til å anerkjenne betydningen av faglig ledelse. SFFene innebærer både nye ledelsesutfordringer og flere stillinger til faglig ledelse. Organisering av SFFer har bidratt til en hovedsakelig fruktbar debatt om ledelse og personalansvar ved universitetene.

SFF-ordningen har medvirket til økt nasjonalt samarbeid, særlig på fagområder med mer enn én SFF. Samarbeidet med andre norske grupper har også økt, hovedsakelig fordi finansieringen gjør sentrene i stand til å styrke sitt nasjonale nettverk.

Anbefalinger

Delkapittel 5.2 tar for seg hvordan SFF-ordningen kan forbedres. Hovedpunktene i anbefalingene er som følger:

Seleksjon av SFFer

- Norges forskningsråd bør respondere på misnøyen med hvordan SFFene plukkes ut og vurdere hvordan organiseringen av den internasjonale vurderingskomiteen kan forbedres. Misnøyen er relatert til at alle søknader vurderes i én flerfaglig komité, og at dette kan innebære vurderingskriterier som diskriminerer enkelte fag, samt manglende åpenhet i prosessen. Separate ekspertpaneler for de ulike fagområdene, et klart mandat til å fordele eller sammenlikne søknader på ulike områder, samt å åpne for at søkerne

kan gi tilsvar på ekspertvurderingene, vil kunne sikre mer "likestilling" mellom fagene og gi mer åpenhet og legitimitet til prosessen.

- Vertsinstitusjonenes prioriteringer og vilje til å støtte SFFene er viktig for deres suksess. Når SFFene velges ut bør forventede, varige effekter tas med i vurderingene. Det bør imidlertid ikke kreves økonomiske forpliktelser fra vertsinstitusjonene utover SFF-perioden.

Rammebetingelser og senterorganisering

- Vertsinstitusjonenes medfinansiering, dekning av overheadkostnader og mangel på inflasjonsjustering av SFF-bevilgningen beskrives av informantene som problematiske forhold ved ordningen. Disse problemene synes å bunne mer i (ulike) forståelser av SFF-ordningens rammebetingelser, enn i rammebetingelsene selv. Rammebetingelsene bør derfor kommuniseres klarere, og institusjonene og sentrene bør rettledes i hvordan de kan tilpasses lokale forhold og hvordan negative effekter av medfinansieringen kan unngås.
- Sentrene er svært ulike og har ulike organisatoriske behov. Når det gjelder organisering og styring av sentrene, er de viktigste forbedringstiltakene knyttet til klargjøring og tilpasning. Det enkelte senter bør klargjøre sine ambisjoner for integrering i lokale forskningsmiljøer, og styrerepresentasjon, tilknytning til morinstitutt(er) og ledelses-struktur bør organiseres slik at de definerte målene ivaretas best mulig.
- SFFene bør delta i nasjonale initiativer og ta ansvar for en bredere kvalitetsheving innen sitt fagfelt nasjonalt. Samtidig må fremragende forskning og samarbeid med internasjonalt ledende grupper gis første prioritet.

Ivaretakelse av kompetanse og fremragende forskning etter SFF-perioden

- Hvordan kompetanse og fremragende forskning ivaretas etter SFF-perioden vil avhenge av de involverte forskningsgruppenes initiativ og suksess, samt generelle vilkår for fri grunnforskning. Sentre som er godt integrert i sin vertsinstitusjon vil ha bedre mulighet for å ivareta kompetansen og forskningen etter SFF-perioden. Verts-institusjonene bør bistå i planleggingen av fremtidig organisering og lokal integrering, samt i å søke om eksterne midler.

Executive summary

The Norwegian Centres of Excellence (CoE) scheme was established in 2002/03 with the aim of promoting cutting edge basic research through long-term, generous funding, strengthening internationalisation of Norwegian research and promoting researcher recruitment. Currently, the scheme comprises 21 centres.

The main purpose of this evaluation is to provide insight such that the scheme may be improved before the next call for CoE proposals. The Terms of Reference (ToR) of the evaluation ask for an examination of the financial aspects and the added value of the scheme. It is a *preliminary* evaluation of a scheme where the first Centre period will end in 2012, and it does not study scientific impact or the success of individual CoEs. The data sources include interviews with a broad range of stakeholders, questionnaires to the 21 CoEs and the 18 non-successful finalists in the 2006 CoE competition, as well as written background material and national statistics. Main conclusions and recommendations are summarised below.

Added value and lasting effects

The overall impression of the Norwegian CoE scheme is very positive. It is particularly successful in terms of promoting researcher recruitment and strengthening the internationalisation of Norwegian research. There is also an increase in national and interdisciplinary collaboration.

Informants point to the long-term and lump sum funding as a major premise for the success. The CoE funding enables building strong research communities and to attracting highly qualified scholars. Internationalisation is strengthened through sponsoring international projects, senior researchers in part-time positions, guest researchers and generally increased funds for travelling. All CoEs report that they have increased their role in making Norwegian research internationally visible.

Moreover, the excellence status in itself is important to the CoEs. Because the scheme requires the build-up of a new academic unit, the status becomes central in acquiring institutional and external support in the early phase. The status also helps securing additional funds and attracting highly qualified scholars and partners in a build-up phase. A few informants were critical about the selection process for CoEs, but this did not seem to affect the status of the scheme.

The data indicate that the CoE scheme has led to increased competition and is likely to have lasting effects on work-sharing between the universities in Norway. The scheme has led to heightened ambitions and aspirations both for the involved groups and for other groups attempting to qualify for the scheme. Also the high degree of internationalisation,

including PhD students who will have a career abroad but retain strong ties to Norway, will likely have lasting effects.

There are clear differences between the research institutes and the universities in how they profit from hosting a CoE. Concerning opportunities for long-term basic research, increased international scientific collaboration and involvement in doctoral training, the added value is higher at the research institutes than at the universities. For the universities, impact on research administration and strategy is clearly higher than at the research institutes. Whereas the CoEs have led to increased attention to and "enforced" learning in research organisation and management at the universities, at the research institutes the CoEs have given rise to few new challenges and consequently less impact in this respect.

The data indicate that location of the involved researchers in one site/building (co-location) strengthens the synergies and creates a dynamic and collaborative research environment. A notable finding is that some of the centres which are not co-located report less international impact. Nevertheless, the CoEs have different needs, and in some cases co-location may be counterproductive.

Financial success and harder competition

The CoEs have more external funding and generally better financial terms than most other research groups. On average, CoE funding from RCN accounts for only 20 per cent of the total income of the centres. The average institutional co-payments account for 24 per cent, whereas 17 per cent is additional RCN funding, and close to 35 percent other external funding. This means that the CoE scheme contributes to a considerable accumulation of advantages, at least when it comes to funding and personnel resources. This is not necessarily an unfair advantage, and we have not been able to find evidence that other researchers in the same fields generally are worse off as a result of the CoEs. Overall, the host contribution is lower than the average institutional basic funding in the respective research areas. Moreover, in most cases the CoEs' proportion of funding from RCN does not differ much from the average RCN funding in the respective field of research.

Establishing CoEs still implies harder competition for the institution's internal funds and in some cases reduced resources for other research groups at the host institutions – and also perceptions that this is the case. Informants at about half of the involved institutional units believed the institutional co-payment for the CoEs implied fewer resources for other groups at the institutions. In two cases the CoEs were perceived to have a positive financial net effect on their local research environment.

Analyses of personnel resources in the relevant research areas show that the CoEs employ a large share of the doctoral students in many areas, indicating both a current impact on resource allocations, and a potential for lasting effects in the research field. They also account for a large part of senior and researcher positions in several fields. In places where talent is a scarce resource, implications for neighbouring research fields may be

substantial. Still, it is noteworthy that some CoEs state how they have been able to use their status to attract individuals who otherwise would have gone into industry or other non-academic careers, indicating that the net effect may be positive.

Strained relationships, institutional learning and national collaboration

Among the institutional leadership, the CoEs – and excellence more generally – are given high priority. The CoEs require much extra organisation and administration, but the host institutions still welcome the centres and believe them to be worth the extra effort. Nevertheless, there are several examples of strained relationships between centres and their local environment. Such relationships arrive from "buy-out" of key personnel teaching duties, centres perceived to disturb the balance between scholarly priorities, or more generally from personal attitudes, relationships and limited leadership abilities.

Several findings indicate that the host relations are important for the CoEs. There is a notable correlation between the centre's relationship to its host institution and its achievements. CoEs with good host relations report increased local, national, interdisciplinary and industry collaboration. Where there are strained relationships, the overall score on such collaboration is lower. Furthermore, from the interviews with the CoE directors it is clear that the attitudes of the department head are important in nurturing collaboration and integration between the centres and the rest of the institute/department. Notably, several CoEs have taken measures to meet criticism that they were isolated from other local activities. The fact that the first generation of CoEs are now in their final years and need to plan for the post-CoE period also motivates better anchoring of the research within the host institutions.

More generally, the CoEs are reported to have positive effects on the university's ability to make priorities and organise research, and the appreciation of scholarly leadership. The CoEs imply both new leadership challenges and more leadership positions. The organisation of CoEs has resulted in what is frequently a fruitful discussion about leadership and personnel responsibilities in the universities.

To a certain extent the CoE scheme has increased national collaboration, particularly in those fields where there is more than one CoE and where there is extensive collaboration. Collaboration with other national research groups has also increased – largely as a result of the funding which enables the centres to strengthen their national networks.

Recommendations

Recommendations for further improvement of the CoE funding scheme are presented in Chapter 5.2. They include how the selection of CoEs can be organised, the overall terms and organisation of the scheme, and how to prepare for the post-CoE period – as summarised below.

Selection of CoEs

- The RCN should respond to dissatisfaction with the CoE selection process and consider reorganising the work of the international review committee. The dissatisfaction relates to the multidisciplinarity of the review panel, (perceived) disadvantages for some research areas and lack of transparency in the selection process. Separate review panels for different research areas, a clear mandate for comparing research areas and enabling applicant comments on the expert reviews would better ensure equal possibilities of research areas and enhance the transparency and legitimacy of the selection process.
- Host institutions' priorities and willingness to support CoEs are vital to their success. When selecting CoEs, the expected lasting values of the centres should be part of the assessments: host commitments to allocating internal resources after the CoE period should not be required.

Overall organisation and financial terms

- Informants describe the institutional co-payments, the covering of overhead costs and flat budgets as problematic. These problems seem more related to the (different) interpretations of the financial terms of the scheme than to the terms themselves. The financial terms of the scheme should be more clearly conveyed, including guidance on the local adaptability of the terms and how to avoid negative effects of institutional co-payments.
- Given the heterogeneity of the centres, their needs concerning organisational structures differ. The most important measures for improving the organisation and management of the individual CoE will be to clarify the ambitions concerning integration in the local research environments and organise board membership, affiliations to "host" department(s), leadership structure etc., in order to serve the defined aims of the centre.
- The CoEs should participate in national initiatives and take responsibility for enhancing the research fields nationally. Their prime priority still needs to be excellence and collaboration with internationally leading research groups.

Maintaining competence and excellence in the post-CoE period

- The maintenance and advance of competence and excellence in the post-CoE period will rely on the initiatives and success of the involved research groups, and the general financial terms for independent fundamental research. Centres well integrated into their local research environment will have a better chance of preserving values in the post-CoE period. The host institutions need to assist the centres in planning their future organisation and local integration, and in applying for external funds.

1 Introduction

1.1 The background and approach of the evaluation

The Norwegian CoE scheme

The *Centres of Excellence (CoE)* scheme is a national programme administered by the Research Council of Norway (RCN). The first thirteen centres were selected in 2002 (based on an open call) and established in 2003. A second call for proposals resulted in eight new centres in 2007. The centres are awarded CoE status and funding for a maximum of ten years (based on a midterm evaluation after 3.5 years). The plan is to continue to announce a new call for CoEs every fifth year.

The aim of the scheme is to "establish time-limited research centres characterised by focused, long-term research efforts of a high international calibre, and where researcher training is an important aspect" (RCN 2005). This involves several interrelated goals for the scheme, as listed in the Terms of Reference for the evaluation (see Appendix 2). These are to:

- *promote and award scientific quality* in Norwegian research
- promote cutting edge *basic research* through *long-term, generous funding*
- strengthen *internationalisation* of Norwegian research
- create *added value* by establishing centres in host institutions
- build strong research *groups*
- promote researcher *recruitment.*

The scope and Terms of Reference of the evaluation

The main purpose of this evaluation is to provide input to RCN before the next call for CoE proposals. The Terms of Reference (ToR) of the evaluation ask for an examination of the strong and weak points of the scheme, and the added value and the challenges that the CoEs represent for the R&D system in Norway. Due to time constraints and the fact that there is still limited experience with the scheme, the main focus of the ToR is *financial aspects* and the *added value* of the CoE scheme (ToR paragraph 1.3, see Appendix 2). Recommendations are expected concerning:

- the financing of the CoEs and the general terms of the scheme,
- the organisation and national role of the CoEs,
- the strategies for taking care of the values created after the CoE period.

In addition to providing input to the RCN concerning the next call, the present CoEs and their host institutions may benefit from the evaluation of the managerial, financial and strategic aspects of the CoEs.

1.2 Methods and data sources

The evaluation is based on a wide set of data sources: documentary evidence, questionnaires to the 21 CoEs and the 18 non-successful finalists in the 2006 CoE competition, and interviews with a broad range of stakeholders. Supplementary sources include NIFU STEP's R&D statistics, media searches to compare visibility of successful and non-successful CoE applicants as well as input from relevant literature and related studies on excellence and centre organisation.

The questionnaires to CoE directors and the non-successful finalists covered all major issues in the Terms of Reference, and the experiences of the CoEs and "nearly-CoEs" constitute an important data source for the evaluation. The questionnaires were designed for qualitative analysis (open reply/comment boxes), but also contained a few pre-categorised reply alternatives designed to measure the impact on specific issues such as resource situation, internationalisation and collaboration. For other quantitative analyses, data from annual reports to the RCN and the NIFU STEP R&D statistics were used. To avoid extra work for the CoEs, some questions from the self-evaluation form of the midway evaluation of the first CoEs were repeated in the questionnaires.[1] The questionnaires are given in Appendix 4.[2]

Three different fields of research covering a large proportion of the CoEs were selected for more detailed studies: life sciences, geosciences and the humanities and social sciences. In these fields the questionnaires from the CoEs and non-successful CoE finalists were supplemented with individual interviews (ten CoEs and five finalists). These were semi-structured, elaborating on the questionnaires and discussing views on the CoE scheme. Each interview lasted ½ to 1½ hours (longer for the CoEs than the finalists); most were phone interviews.

In the analysis, the experiences of the CoEs and finalists were compared along relevant dimensions – such as research area, type of host organisation, size and co-location – in order to identify possible common conditions for added value and restraints on the centres. Note that the non-successful CoE finalists do not constitute a control group in the analysis (with some exceptions, see Sections 3.2 and 3.4). The added value of participating in the CoE competition and obtaining the finalist status is extensive, and the finalists cannot be considered as ordinary research groups or an adequate control group for analysis of added value of the CoE scheme.

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[1] These were mainly for the second generation CoEs who had not yet delivered a self-evaluation. The first generation CoEs were told that they only needed to indicate possible changes/experiences in the period after their self-evaluation.

[2] The data include 38 questionnaire respondents: replies from 20 of the 21 CoE directors (one CoE director did not find time to reply even after two months and repeated reminders), and replies from 18 CoE competitors (all non-successful finalists in the 2006 competition).

In addition, interviews with involved parties included CoE board members and partners, research fellows at the CoEs, representatives of all host organisations, RCN and its review panels. In total there were 18 individual interviews and 14 group interviews (18 plus 58 persons). An overview of informants as well as the other data sources is given in Appendix 3.

Although our data are not based solely on interviews with people who represent CoEs – but also their host institutions at various levels and non-successful CoE finalist – the data set is not representative of the entire Norwegian research community. Our impression is that the informants have responded openly and reflectively, which of course was also made easier by this being an evaluation of the CoE scheme rather than of the centres themselves. We therefore chose to emphasise the experiences of the researchers and leaders in and close to the centres as well as others with relevant knowledge of the scheme.

Note that this report's assessments of the success and added value of the CoE scheme are preliminary. The first Norwegian CoE period is not yet completed. Moreover, the assessment of scientific results is not part of the mandate for the evaluation (Appendix 2). As explained above, the assessments of the added value of the scheme are based on the accounts of the involved parties. In order to motivate informants to give their honest opinion about effects of the scheme, they were guaranteed anonymity. It was emphasised that the information they provided would be handled confidentially and that it was the CoE funding scheme and not the separate CoEs which was to be evaluated. To maintain anonymity, the details given in the report are restricted. We may, for example, talk about a centre in the life sciences or in the institute sector but not both types of information (including geographical location) as identification would be easy for many readers.

2 Funding of the CoEs

The ToR ask whether there is a better way to finance CoEs in Norway. In order to address this question, we examine the resources and funding profile of the CoEs and their financial challenges in this chapter. Where possible, we try to adopt a comparative perspective to see how the CoEs fare in light of the more general picture of funding of Norwegian research.

The CoE scheme is funded by the yield on the Fund for Research and Innovation (administrated by RCN). Each CoE may receive funding for a maximum of ten (2x5) years. Midterm evaluations of the CoEs are conducted to assist the Council's decision on prolongation of financial support for the second five-year period. The requirement and guidelines for the CoE scheme state that RCN and the host institution shall jointly contribute to the resources required for the centre's research (RCN 2005, page 6). A five-year contract between the host institution and RCN defines the financial obligations of the host institution as well as the RCN contribution to the CoE. The size of the RCN funding as well as the host's co-payments are based on the cost and funding plan of the CoE application. In this way both the RCN funding and the host contribution are fixed in the contract period and do *not* depend, for example, upon the amount of other funding the CoE is able to attract. There are no restrictions on other funding the CoE may receive or the size of the centres.

2.1 Overview of budgets and funding sources

There is a great variety in the size and budgets of the present 21 Norwegian centres. Total income varied from 17 to 156 million NOK in 2009. Measured in total scholarly positions, the smallest centre had 18 full time equivalents, the largest 119 (data for 2009). The average was 44 full time equivalents per CoE.

It is not the CoE funding that varies most, but the centres' other income. For the largest centres the CoE funding accounted for 8–12 per cent of the total income in 2009, whereas for the smallest centres it accounted for 40–50 per cent. As shown in the table below, the CoE funding from RCN varied from NOK 5.2 to 20.8 million per centre in 2009. On average, CoE funding from RCN accounted for 20 per cent of the total income of the centres (Table 2.1). Some of the centres have obtained other funding from RCN far surpassing their CoE funding, while others have no or limited additional RCN funding.

Table 2.1 CoE funding 2009, million NOK.

Centre	Total income 2009 (including transfers from 2008)	CoE funding 2009 (RCN)	Other funding from RCN 2009	Funding from host institution 2009
Center of Molecular Biology and Neuroscience, CMBN	156.2	20.8	40.5	35.1
Centre for Ecological and Evolutionary Synthesis, CEES	120.1	10.1	43.9	31.1
Centre for Cancer Biomedicine, CCB	102.4	11.1	12.5	6.7
Centre for Immune Regulation, CIR	94.9	11.0	9.5	26.5
Bjerknes Centre for Climate Research, BCCR	94.9	11.2	24.2	20.4
Centre for Integrated Petroleum Research, CIPR	74.8	14.0	13.3	12.5
Centre of Mathematics for Applications, CMA	67.6	12.0	4.8	20.2
Centre for the Biology of Memory, CBM	50.0	10.0	11.7	14.6
Cenre for Ships and Ocean Structures, CeSOS	47.6	10.0	1.9	10.3
Centre for Geobiology, CGB	43.2	15.3	8.4	15.2
Physics of Geological Processes, PGP	38.4	9.3	5.7	11.2
Center for Quantifiable Quality of Service in Communication Systems, Q2S	36.9	15.0	0.0	8.9
Center for Biomedical Computing, CBC	35.0	8.2	3.5	10.2
Aquaculture Protein Centre, APC	34.1	10.0	4.9	7.9
International Centre for Geohazards, ICG	31.7	14.0	0.0	6.0
Center for the Study of Civil War, CSCW	30.0	11.0	7.0	0.8
Centre for Medieval Studies, CMS	28.5	5.3	2.4	10.1
Centre for the Study of Equality, Social Organization, and Performance, ESOP	26.0	12.4	0.0	7.8
Centre for the Study of Mind in Nature, CSMN	23.9	8.6	1.5	12.5
Centre for Theoretical and Computational Chemistry, CTCC	22.3	11.1	3.3	7.9
Center for Advanced Study in Theoretical Linguistics, CASTL	17.2	8.6	0.0	8.7
Sum million NOK (21 centres)	1175.9	239.0	198.9	284.7
Per cent of total income	100.0 %	20.3 %	16.9 %	24.2 %

Source: RCN

On average, host institutions contribute about a quarter of the total funding. In total, the host institutions contributed more to the CoEs than was the case of CoE funding from RCN in 2009 as well as in 2008. Moreover, the external income from sources outside RCN is high (about 35 per cent in 2008 and 2009).

2.2 Impact on resource allocation: comparisons with other Norwegian research

Personnel resources

The CoEs have different national research environments. Some are part of a research field with large resources in terms of number of senior scholars as well as recruiting positions (PhDs and postdocs). Others are part of relatively small research fields. This results in different potential for impacting the resource allocation within the research field. Table 2.2 shows the number of personnel involved in the CoEs compared to the total number of positions within the field at the relevant kind of institutions (the upper part of the table includes the five universities with CoEs; the lower part includes comparable independent research institutes). To undertake this kind of comparison, we need to partly disregard the multidisciplinarity of the CoEs and concentrate on their main field of research. Note that at some of the centres there are many part-time scholars (this appears from the difference between the number of positions and the full-time equivalents in the first columns). Excluding recruiting positions, 580 scholars were involved in the CoEs in 2008, and their work at the centres amounted to 312 full time equivalents. This complicates comparisons with overall figures for the fields. Whereas full-time equivalents (in parentheses in Table

2.2) indicate the resources allocated to CoEs, the total number of involved staff is a better measure of the potential lasting impact on the field.

Table 2.2 CoE personnel resources compared to the research area at large in Norway: Number of professors, researchers, PhD fellows and Postdocs 2008

# CoE	**Field of research/kind of research institute	Professors and researchers				Postdocs		PhD fellows	
		CoEs		*Overall figures					
		(full time equiv.)***	#	Prof. etc****	Researchers	CoEs	*Overall figures	CoEs	*Overall figures
1	Chemistry	(7.2)	12	90	15	7	37	2	101
1	Economics	(6.3)	28	96	10	4	19	4	45
4	Geosciences	(100.2)	166	140	77	44	62	88	158
	Physics (included in several CoEs)			144	23		50		149
1	History	(7.9)	10	122	12	9	26	6	77
1	Linguistics and Literature	(6.5)	7	218	11	1	22	9	87
6	Life sciences	(120.1)	159	566	196	115	252	157	580
1	Mathematics	(17.3)	36	134	8	18	28	40	117
1	Philosophy	(5.4)	15	169	3	6	19	8	38
2	Engineering and Computer and Information Science	(9.0)	24	435	94	23	145	62	689
1	National Social Science Institutes	(10.7)	37		577	1	9	11	61
2	Technological and Industrial Research Institutes	(21.6)	86		1537	23	63	37	117

Sources: Figures on CoE are from RCN. Overall figures are from the NIFU STEP Register of Research Personnel.
* Overall figures for the 10 fields of research include the five universities which host CoEs: NTNU, UiB, UiO, UiT and UMB. Overall figures for the institutes 11 institutes include under the heading National Social Science Research Institutes in the "Key figures on research institutes" in the national R&D statistics, and 15 institutes include under the heading Technological and Industrial Research Institutes in the "Key figures on research institutes" in the national R&D statistics (http://foustat.nifustep.no/nifu/?language=en), and in addition Simula Research laboratory/Simula School of Research and Innovation.
**Some adjustments in the standard categorisation of departments were made to assure that all relevant research units were included (that is, multidisciplinary departments/units are included under their most relevant CoE research field). "Linguistics and literature": There is no CoE within literature, but the classification of the university departments does not allow figures for linguistics only.
***Full time equivalents at the CoE.
****The category professors etc. includes all *permanent* academic staff at the five universities.

In several fields the number of scholars at the CoEs accounts for a large part of the total number of positions in the field. In the geosciences, economics and mathematics and life sciences, the numbers of scholars (*excluding* recruits) at the CoEs amounts to 20 per cent or more of the scholarly positions in the research field. With such high proportions of staff involved in CoE activities, the CoEs are likely to have substantial impact on the research field.[3] Note that there are obvious difficulties with the categorisation of CoEs into research fields as given in Table 2.2, and for some fields the potential for impact may be higher than the table indicates (e.g. linguistics and philosophy).[4]

[3] There may be differences in the CoEs' reporting of part-time staff (the figures from 2008 show that the number of scholarly staff reported varies from 108 percent of the CoE's full time equivalents within linguistics to 444 percent within economics). In some fields the number of involved staff may consequently be higher than appearing in the table.

[4] The staff at the CoE in linguistics should be compared to the number of personnel within linguistics only (for which we have no figures), not the combined field of linguistics and literature. The staff at the CoE in philosophy, on the other hand, could be more accurately compared to overall research capacity if figures were based on full-time equivalents for research (the staff in philosophy includes a high proportion of teaching staff and also more part-time positions than in other fields). Hence, for both linguistics and philosophy the CoEs may constitute a relatively large part of the research activities.

Looking at full-time equivalents and present impact on resource allocation, geosciences, life sciences and mathematics remain those fields where the CoEs account for the largest proportions of the personnel resources (excluding recruit positions). The proportion is particularly high within the geosciences (the full-time equivalents at the CoEs account for 46 percent of the positions in geosciences, declining to 26 percent if we also include physics in the calculations).

Moreover, the CoEs account for a substantial part of the *research recruits* in many of the relevant research fields, for instance 18 out of 28 postdoc positions in mathematics and 115 out of 252 postdoc positions in life sciences[5] (Table 2.2). The recruiting positions at the CoEs are sponsored by a number of different sources, not only the CoE funding. We do not have information on the number of PhD and postdoc positions sponsored by CoE funding and the number of recruiting positions at the CoEs sponsored by other sources (national or international programmes or private assignments or donations). Consequently, it is difficult to estimate the impact of CoEs on the number of recruiting positions in the various research fields. Judging from the questionnaire and interview data, the CoEs have both attracted more recruits to their field and acquired some positions that would otherwise be held by other units in the research field. In any case, the CoEs employ a large proportion of the recruits, which indicates both present impact on resource allocations and the potential for more permanent effects on the research field.

Proportion of RCN and basic funding

An alternative way to measure CoEs' potential impact on the research allocation within the field is to compare the relative size of funding sources. As shown in Table 2.1, several CoEs have obtained extensive RCN funding in addition to the CoE funding. Moreover, the institutions provide co-funding of the CoEs. In this section we examine the impact on resource allocation. Do CoEs obtain more RCN funding than other research units? And do they consume more of the basic funding of their host institutions than other units?

Moreover, some CoEs are part of relatively small fields in terms of number of permanent positions (e.g. chemistry) and in other cases the specific research field of the CoE is not visible from the figures (e.g. the CoEs within the broad field Engineering and Computer and Information Science).

[5] The overall figures for the life sciences include biology and biomedicine, but not clinical medicine or personnel with their primary affiliation to a hospital.

Table 2.3 RCN and basic funding in selected research areas 2007 and CoE 2007 and 2008, per cent.

# CoE	***Field of research/kind of research institute	**Centres of Excellence 2007		Centres of Excellence 2008		*Overall figures 2007	
		% contribution by host institution	% RCN (CoE funding and other)	% contribution by host institution	% RCN (CoE funding and other)	% basic funding	% RCN
1	Chemistry	30.6	54.2	30.6	37.0	61.6	31.6
1	Economics	6.8	71.5	14.6	41.6	75.2	15.8
4	Geosciences	23.4	50.8	28.0	44.1	37.1	35.6
	Physics (incl. in several CoEs)					48.6	37.7
1	History	23.1	25.8	34.7	14.4	64.0	24.6
6	Life sciences	20.0	58.2	21.2	37.0	49.2	30.8
1	Linguistics and Literature	51.7	55.9	54.2	35.8	68.3	18.3
1	Mathematics	36.4	36.3	30.3	29.5	61.9	31.6
1	Philosophy	28.8	63.1	39.5	41.0	81.8	14.3
2	Engineering and Computer and Information Science	19.0	35.2	19.7	34.2	48.9	32.3
1	National Social Science Institutes	3.8	63.4	2.2	69.7	22.6	23.9
2	Technological and Industrial Research Institutes	20.5	44.8	24.3	39.8	7.0	12.5

Sources: Overall figures are based on NIFU STEP R&D statistics (figures on the universities are based on their R&D expenditures, whereas figures on the research institutes are based on their current income). Figures for CoEs are based on information on their total income and income by funding sources. These tables were provided by RCN.
* Overall figures for the 10 fields of research include the five universities which host CoEs: NTNU, UiB, UiO, UiT and UMB. Overall figures for the institutes 11 institutes include under the heading National Social Science Research Institutes in the "Key figures on research institutes" in the national R&D statistics, and 15 institutes include under the heading Technological and Industrial Research Institutes in the "Key figures on research institutes" in the national R&D statistics (http://foustat.nifustep.no/nifu/?language=en).
**Delimiting CoE activities from other activities may be problematic, and lines may have been drawn differently when estimating "other RCN funding" than when reporting total funding, CoE funding from RCN and host contribution. In particular, the estimation of "other RCN funding" for 2007 is inexact, illustrated by the fact that for one CoE which started up in 2007, the estimated "other RCN funding" exceeded the total funding of the CoE.
***Some adjustments in the standard categorisation of departments were made to assure that all relevant research units were included (that is, multidisciplinary departments units are included under their most relevant CoE research field). "Linguistics and literature": There is no CoE within literature, but the classification of the university departments does not allow figures for linguistics only.

Table 2.3 shows the differences between research fields. Whereas the CoEs within economics, languages, and philosophy have a substantially higher proportion of funding from RCN than the average in their field of research, the CoEs in other fields receive RCN funding comparable to the field average. Fields within the humanities and social sciences have generally lower shares of funding from RCN than other fields. Obtaining CoE status in these fields therefore gives a significantly higher share of RCN funding than the field average.[6] (See table notes on the different data sources; the national figures and the CoE reports are not fully comparable, and CoEs may have a different basis for reporting external funding as well as calculating host contributions.)

Comparing host institution contribution with average basic funding in the field, we find that that a *lower* proportion of the CoEs' activities are covered by institutional basic funding than the field average. For example, about 20 per cent of the funding for CoEs within the life sciences is host institution contribution, whereas on average 49 per cent of R&D costs for the life sciences at the five universities are covered by basic funding. Similar figures for economics are 15 per cent for the CoE and 75 per cent field average.

[6] It is the CoE funding which accounts for the difference; these CoEs have little other RCN funding, see Table 2.1.

Bearing in mind the large amounts of external funding the CoEs have acquired, this is not surprising. Being research units with more external funding than the average within their research field, their relative share of institutional basic funding is substantially lower than average.

There are also differences within the institute sector. The CoEs at the independent research institutes clearly have a higher share of funding from RCN than the average for the research institutes.[7] These institutes do not normally have a high proportion of RCN funding, but their CoEs do have. Contribution by the host institution is also different from the average figures. The CoE at a social science institute has a lower contribution from its host institution than the average basic funding for these institutes. The Norwegian technological and industrial research institutes on the other hand, have on average very low basic funding and their CoEs have higher contributions from their host institution than the average for the sector. However, one of the technological institutes with a CoE has high basic funding.[8] For this institute, the proportion of contribution by the host institution to the CoE is lower than the basic funding for the institute at large. In sum, there is substantial variation in how the research institutes support their CoEs, and there are also few CoEs in this part of the Norwegian research system.

Financial impacts on the non-successful CoE finalists

The CoE scheme has not only increased the research resources of the groups obtaining CoE status, but has also resulted in increased research resources for the majority of the non-successful CoE finalists. The 18 CoE finalists in 2006 were asked about their present financial situation compared to their situation at the time of the application. The majority (13 of 18, Table 4.1)[9] report that they now receive more funding from their own institution than before, and all of them received some institutional funding for the research suggested in the CoE application (varying from 1 PhD position to 13 mill. NOK).

Moreover, a large part (8) of the finalists report that they have more funding from RCN than before; four report that they have less RCN funding, and the remaining six have about the same amount of RCN funding (Table 4.1). In general, the finalists are very satisfied with the effects of their CoE finalist status, both in terms of funding and attention (see Section 4.2.2 on how the finalists assess the CoE scheme's impact on their own activities).

Note that only the main applicant, and not the partner organisations, replied to the questionnaire. We have no indication that the partners have experienced the same effects as

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7 Note that the figures for the CoEs include the host institution as well as consortium partners which may include different kinds of institutions. The analysis does not account for these differences, but counts each CoE according to its formal host institution.

8 This institute, Simula Research Laboratory, is not a standard independent research institute included among the technological and industrial research institutes in the national statistics.

9 Of the five not reporting to have received more funding than previously, four report that they receive the same. One reports receiving less as a result of reductions in the overall budget of the university.

the main applicants. In fact, some of the interviewed finalists explain that the collaborative part of the CoE project could not be realised when the CoE funding was not awarded.

2.3 Financial challenges for CoE hosts

Different local impacts

The host institutions do not have budgets displaying net profit or loss from their CoEs, and they have different perceptions of the financial implications for other groups at the institution. At about half the involved institutional units the informants believed the institutional co-payment for the CoEs implied fewer resources for other groups at the institutions. In particular, CoE contracts earmarking PhD positions for the CoEs, or involving similar extensive obligations, were perceived to have negative impacts on the local surroundings. Still, many emphasised that it was hard to measure the financial impact on the surrounding groups or other part of the organisation, and about half of the informants expressed no concern about fewer resources for other groups. Moreover, in two cases the CoEs were perceived to have a positive financial net effect on their local research environment; in one case because PhD positions could be used for other groups than those in the CoE.

Thus, the host institutions have different perceptions of the financial impacts and the challenges concerning the financing of the CoEs. Some thought there was a risk that CoEs weaken other research groups at the university by absorbing much of the institutional basic funding. Some stated explicitly that the host institution's contribution to its CoEs was too high and implied fewer resources to other units. Others stated that the host contribution was modest and that the CoEs were not a financial loss for the host institution. A few saw the CoE as a financial profit for the local environment. The various perceptions were particularly linked to how PhD positions were allocated locally – whether CoEs implied more or fewer PhD positions at other research units.

Generally, it should be noted that the university host institutions report that the CoE scheme has affected their strategic priorities (see Chapter 4). They have adopted more explicit policies to promoting and award high quality research. The CoE scheme is one of the major reasons for the universities' increased emphases on promoting and awarding high quality research, many informants claimed. Universities use their basic funding to support both successful and unsuccessful finalists in the CoE competitions as well as finalists in similar funding competitions. Moreover, many of the involved institutions reported that they allocate PhD positions based on scholarly quality, implying that the CoEs may acquire a large part of the PhDs even when these positions are not an earmarked part of the institutional co-payment.

The host institution contribution and different perceptions of host obligations

According to the requirements and guidelines for the CoE scheme, the host institutions are required to cover overhead costs and infrastructure for the CoEs:

> *"Co-payments can consist of funding, human resources at the disposal of the centre and/or essential infrastructure. The Research Council of Norway requires that the host institution and any collaborating consortium participants cover costs associated with premises, electricity, heat and other infrastructure for the centre, and that a reasonable amount of scientific equipment be provided."* (RCN 2005, page 6).

Some informants at the host institutions pointed to challenges because CoE funding from RCN does not cover the full overhead costs for the centres. There was the impression that the CoEs were more expensive for the host institution than other externally funded research projects for which external funds cover the overhead costs. Here, as for the co-payments in general, the perceptions varied: some expressed concern with the covering of overhead costs, others did not. One explanation for these differences seems to be that the requirements and guidelines for the CoE scheme were understood differently at the host institutions. The institutions receive a lump sum for each CoE. The institutions differ both with regard to the degree this lump sum is used for covering overhead costs, and with regard to their perception of whether they are allowed to use the funding for covering overhead costs.

As explained in the introduction to this chapter, the host's co-payments are based on the budgets suggested in the CoE applications. There are no fixed requirements for the amount of co-payments. The requirement and guidelines state that when selecting the CoE, RCN "will attach importance to participants' co-payments" based on their capacity to contribute "resources of their own" (RCN 2005, page 6). It is moreover stated that project grants or strategic grants from RCN or other sources may count as co-payment. This has probably been interpreted differently. The variations in the host institution contributions (Table 2.1) indicate that to varying degrees the hosts cover the overhead costs of the CoE, and that the requirement that the host should cover (some) overhead host need not be a problem. The differences may also indicate variations in how host institution contributions are estimated (e.g. charge for office space/premises).

As the contracts defining the co-payments for each CoE are based on the budgets suggested in the CoE applications, there is a need for the host institution (and partners) to negotiate this with the groups applying for CoEs before the applications are submitted. The reason for dissatisfaction with co-payments at some of the institutions may be insufficient clarity on the terms for co-payments at the time of the application. Furthermore, there seems to be different budgeting practices at the institutions. Whereas some include a charge for office space as part of their co-payments, others do not.

Another challenge is that the CoE budgets are not adjusted for inflation. Several informants complain that the RCN does not adjust the CoE funding according to inflation rates. Some of the CoEs have had to cut down on activities or put extra effort into finding external funds to compensate for the reduced value of the CoE funding. This issue came up in the midway evaluation process and was subsequently discussed in the RCN Executive Board. As the Board decided that the RCN funding for the CoE should not be adjusted for inflation, flat budgets remain a challenge for the institutions.

CoE and performance based funding

As part of the performance-based funding of Norwegian higher education and research institutions, a share of the host institutions' basic funding is based on their performance (PhD candidates, scholarly publication, externally funded research projects).[10] The activities of the CoEs generate performance-based funding in the same way as other host institution activities. The institutions have adopted different ways of distributing their performance-based funding internally. In some cases the host department/the nearest research environment to the CoE receives the performance-based funding; in other cases the funding is part of more general strategic initiatives or perceived to "disappear" into the budget of the host university or the host faculty.[11] (In most cases there are different routines for allocating the different elements of the performance based funding – the scores for PhD candidates, publications and external funding respectively). In many of the institutions the allocation of this funding has resulted in debate, and several report that they have taken efforts to clarify their routines and assure that that at least part of the performance-based funding is allocated to the host department/the unit providing personnel and other resources to the CoE.

It should also be noted that performance-based funding, and the publication scores in particular, imply a new kind of transparency in academia – making it very easy to compare colleagues' productivity. In some of the interviews reference was made to cases where people outside the CoE were much more productive than those inside, making it harder for the CoE to obtain the status of an eminent research group locally. Others considered that the CoEs had an unfair advantage (they are set up as "publication factories") in the competition for funds.

Restrictions on temporary positions

Restrictions on employing temporary personnel impact the university-based CoEs in two different ways. As the centres are temporary, the universities often hesitate to offer CoE staff permanent positions. This implies some limitations on attracting the best senior scholars to the CoE. Moreover, in most cases the CoE director is granted leave from

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[10] The performance indicators are somewhat different for the higher education institutions and the research institutes.

[11] Throughout this report, 'faculty' refers to organisational units at the universities and not to staff/faculty members.

his/her regular teaching obligations and other duties; in some cases also other CoE personnel are granted such a leave. There is consequently a need for temporary staff to take over teaching and other duties on behalf of the CoE director and other key CoE staff. Whereas the CoEs have a need for temporary staff for a period of 10 years, Norwegian regulations set the maximum period of temporary employment to four years.

The universities have different ways of handling the restrictions on temporary positions. In some cases staff hired to take care of key CoE staff regular tasks are offered a permanent position. At the University of Bergen, parts of the CoEs are organised under Uni Research AS where the CoE researchers are offered ordinary research positions. At other universities some informants emphasise that they take care to restrict contracts to maximum four years to avoid financial obligations beyond the CoE period. Others state that the four-year restriction on temporary employment does not apply to staff employed to work on specific and temporary projects, and if there is no more work for the CoE staff, or the substitutes at the host institution after the CoE period, dismissing the redundant personnel should not pose a problem.

2.4 Financial implications: main findings

The financial success of the CoEs

The above analyses show that the CoE funding from RCN accounts for only 20 per cent of the total income of the centres. Hence, the added funding of the CoEs is extensive. Some of the CoEs attract much additional funding from RCN; others attract considerable income from sources outside RCN (EU etc.).

The average host co-payment to the CoEs is substantial (24 percent of total income in 2009), and varies greatly between centres (from 0.8 to 35 million in 2009). The host contribution is lower than the average institutional basic funding in the field. This is due to their higher proportion of external funding.

Impact on resource allocation

The ToR ask whether the "resource allocations to the CoE have negative implications for other research development". Concerning the financial implications for other groups at the host institutions there are different perceptions among the informants. At about half the involved institutional units the informants believed the institutional co-payment for the CoEs implied fewer resources for other groups at the institutions. Negative experiences in particular concern the agreed co-payment for the CoEs, for example, earmarked PhD positions. The reason for dissatisfaction with co-payments at some of the institutions may be insufficient clarity on the terms for co-payments at the time of the application. There are also different perceptions of the host's obligations to cover overhead costs for the CoEs which may explain some of the different experiences and opinions.

Taken together, the data indicate that the CoEs imply harder competition for internal funds and in some cases reduced resources for other research groups at the institution, in particular personnel resources. Still, much has been done at the local level to avoid such effects. Experiences from the establishment of the first CoEs resulted in attempts to integrate the CoEs better into their local environment, to avoid antagonism, and organising such that the local environment would benefit from hosting the CoE. The large centres are likely to have more impact on their local environment since they engage more personnel resources. Smaller centres may also have substantial impact when they absorb all personnel in a particular field. There are still many examples of good integration in the local environment and examples of effective measures for avoiding absorption of vital resources or a split between the centres and their local environment. These include involving local staff through part-time positions and office space for guests at the CoEs, and CoE key personnel maintaining (some of) their teaching at the host departments. Moreover, postdocs and other temporary CoE staff have been involved in the teaching at the host institution, and seminars and other activities at the CoEs have been open to the local staff. Such integration is also seen as a good preparation for maintaining the benefits from the CoE in the post-CoE period. Host relations are further discussed in Section 4.1; plans for the post-CoE period in Section 4.3.

Concerning financial impacts outside the CoEs' institutions, data are more limited but still provide some interesting findings. Foremost, the CoE scheme has had positive financial impacts also for the non-successful finalists. These groups have received substantial funding from their own institutions as a result of their CoE finalist status, and a large part of these have also increased their RCN funding.

Analyses of personnel resources in the relevant research areas show that the CoEs employ a large share of the research recruits in many areas indicating both present impact on resource allocation, and the potential for more permanent effects on the research field. They also account for a large part of senior and research positions in several fields. Whether or not this has enduring negative implications for other research groups cannot be concluded from the existing data, but needs further analysis after the completion of the first CoE period.

The question of impacts on the surroundings encompasses much more than financial impacts, and is further discussed in Chapter 4.

3 Added value for the participants

In this chapter the added value of the CoE scheme for its participants is analysed. The questionnaires and interviews with the CoE directors provide the essential basis for the analyses (20 of 21 CoE directors replied to the questionnaire and 10 CoE directors within the fields of humanities/social sciences, geosciences and life sciences were interviewed, see Chapter 1). Moreover, ATEKST/Retriever has been applied to analyse the media visibility of the CoEs. In addition, interviews with and questionnaire replies from CoE finalists are used as a comparative base where relevant.

Table 3.1 shows some overall results from the questionnaires on the added value of the CoEs. In the following, impact questions concerning research resources and recruitment are discussed in Section 3.1, collaboration and international impact in Section 3.2, and local involvement in Section 3.3.

Table 3.1 Research situation of CoEs compared to pre-centre situation. Questionnaire replies from CoE directors. N=20

How is the situation of the present CoE compared to the situation for the key participants/your research group at time of the application?	Increased	About the same	Decreased
a) Research resources (funding, infrastructures and equipment)	18	2	0
b) Ability to attract external research funding (apart from CoE funding)	17	3	0
c) Ability to attract young talented researchers	19	1	0
d) Ability to attract distinguished senior researchers	20	0	0
e) Participation in EU projects and other internationally funded projects	14	6	0
f) Collaboration with internationally leading research groups in your field	15	5	0
g) Role in making Norwegian research in your field internationally visible	20	0	0
h) Collaboration with industry or other research users	10	10	0
i) Collaboration with other* research groups/researchers at your department/institute	10	10	0
j) Collaboration with other* Norwegian research groups/researchers in your field	13	7	0
k) Interdisciplinary collaboration	17	3	0
l) Involvement in teaching at undergraduate/bachelor and master level	4	13	3
m) Involvement in PhD education	16	4	0

Source: Questionnaire to CoE directors.
*Other=researchers not participating in the CoE.

Many CoEs have experienced added value regarding most of the aspects listed in Table 3.1. Notably, *all* respondents perceived that the CoE had increased their ability to attract distinguished senior researchers, and all report that they contribute more in making Norwegian research visible internationally. Undergraduate and master level teaching is the only issue were any negative impact/decreased involvement is reported. Two of the first generation natural sciences CoEs reported improvements on all dimensions in Table 3.1.

Note that a higher proportion of the first generation than second generation CoEs replied positively to most of the impact questions in Table 3.1. Fifty per cent of the newest centres have a net score below 10, whereas only 25 per cent of the oldest have a net score below

10 (counting each increased item as 1, each non-changed item as 0 and each decreased item as –1). That older centres report higher and more improvements may indicate that the centres are more productive in their second period; that some time is needed before the effects emerge. We still need to wait for data for the second period of the newest centres make conclusions on this.

3.1 The significance of the CoE status and funding

Basic CoE requirements fulfilled

Qualified personnel and adequate funding are basic resources for research. For all the CoEs the situation concerning these resources is improved.[12] The CoE scheme fulfils in this way a basic requirement for added value for the established centres. If the funding and ability to attract scientific personnel had not been improved, the scheme could hardly be deemed a success.

However, for a few of the CoEs all basic requirements for added value are not fulfilled. Two of the consortia CoEs[13] report that the funding, infrastructure and equipment are about the same as before they acquired CoE status. These are found within the field of geosciences and life science. Three of the newest CoEs report that their ability to attract external research funding apart from the CoE funding is about the same as before, but considering that all of the first generation CoEs have increased their external funding it might be expected that this also will occur for these. Finally, one of the first generation CoEs reported that the ability to attract young talented researchers is not improved. Insofar as these CoEs report stability and not a decrease and that it only concerns a few CoEs, such minor deviation ought not to be regarded as significant for the overall evaluation of the scheme.

The combined effect of excellence status and adequate long-term funding

Both long-term funding and the excellence status are reported by all the informants (CoE directors) to be important for the success of the CoEs. The majority of the respondents stated that the *excellence status* increased their visibility and prestige, for example "The most significant added value of the CoE status is visibility. This automatically leads to new research opportunities, "The status of the CoE has made us more visible on the national and international arena" and "The prestige comes with a great deal of responsibility for making the centre a success". Hence, the status creates new opportunities for the centres at the same time as it includes an implicit expectation of high quality and that they become a success. Other informants emphasised that the status was especially important in establishing contacts with international partners in the initial phase of the CoE and in

[12] Fifteen CoEs report improvement on all four first questions in Table 3.1; all report improvement on at least two of these four questions.

[13] CoEs with one of more institutional partners outside the host institution.

establishing contacts with industry and policymakers – it thus functions as a door opener. For some the status also had an effect on attracting international funding (see paragraph below and Section 3.2).

More important than the status, however, was the *funding.* Many of the CoE directors claimed in the interviews that the funding provided the basis and the possibility to build up a strong research environment which attracts attention both nationally and internationally. The main added value of the CoE funding according to the questionnaires and interviews was its long-term characteristics. They claimed that the long-term funding provides security, makes long-term planning possible and creates opportunities for more risky long-term projects. Furthermore, the flexibility of the funding makes it possible to "to seize important and sudden opportunities" and "to pursue basic research with a potential for future innovation". The CoEs in the humanities and social sciences emphasised the possibility to expand the group of researchers and the increased time and opportunity for doing research. One wrote: "The funding allows scholars to spend more time doing research and encourages them to finish and publish more work". Another group that stood out was the CoEs within the life sciences; here the importance of the funding was stressed concerning the possibility to gain new infrastructure such as equipment and hiring technical support personnel thereby releasing time for more effective research.

From both Table 3.1 and the interviews it is clear that the ability to attract young talent and distinguished seniors is one of the most important added values of the scheme. Several informants emphasised that the funding gave flexibility for hiring researchers in part time positions, to extend collaborative networks and enhanced flexibility in terms of providing temporary money for recruitment of postdocs in order to secure candidates with other job opportunities. Moreover, the funding also provided the possibility to heighten the level of activity, e.g. conferences, seminars and workshops both in-house and internationally (travel funds) which contributed to the centres' increased visibility. Nevertheless, some CoEs experience challenges in recruiting PhD candidates and seniors. Especially in fields such as the geosciences – where there is competition with industry for attractive recruits, and chemistry – with a more general lack of good candidates, challenges were experienced in recruiting young scholars. In other fields such as economics and certain branches of the life sciences there is severe competition over star academics. The relatively low salary level at the universities as well as other conditions such as geography and climate in Norway make it difficult to attract these. However, the flexibility of the scheme contributed to enhance the possibility for the centres to attract both young and senior scholars.

Other added values of the scheme concern the possibility to create an interdisciplinary unit. One director claimed that the CoE funding had provided a unique opportunity to develop an interdisciplinary group of talented scientist and students. The group developed ideas, research approaches, and analytical techniques far beyond what the director had expected. Others praised the scheme for allowing high risk projects which do not build on previous

projects but solely on the researchers' track records. In other applications the researchers typically have to present temporary research results of their project which they claim limits the potential for creativity. Furthermore, for the research institutes the flexibility of the lump-sum funding rendered it possible to provide matching funds for EU grant applications. This was stressed as very important since the institutes generally have low basic funding.

Overall, the CoE scheme can be said to have extensive added value for the established centres. Their ability to attract additional funding and highly qualified scholars is improved, their prestige and visibility is increased, and the flexibility and the long-term funding facilitate interdisciplinary research and innovation.

Effects on success in other funding schemes

As shown in Section 2.1, many of the CoEs have acquired considerable funding from RCN apart from the CoE funding, as well as from other external sources (Table 2.1); 18 of the CoEs have increased research resources compared to the pre-centre situation (Table 3.1).

Available data on Norwegian participants' success in the EU 7th Framework Programme (FP7) show high success for FP7 applications related to the Norwegian Centres of Excellence or to the Centres for Research-based Innovation (CRI/SFI) (Table 3.2). This success is most notable within the FP7 priority *Environment* (Kaloudis et al. 2009, page 116-117). A closer analysis indicates that the success rate of the CoEs was somewhat higher than for the CRIs.

Table 3.2 FP7: proposal success by national funding.

Was the EU project closely related to research for which you received Norwegian public funding?	**Application status**			
	Rejected	Funded	Uncertain	**N**
No	66.8	28.7	4.6	527
Yes, Research Council of Norway programme	69.7	28.1	2.2	320
Yes, CoE or CRI funded by the Research Council of Norway*	*53.1*	*43.8*	*3.1*	*32*
Yes, other national funding	71.0	24.2	4.8	124
****Total**	**67.8**	**28.4**	**3.8**	**932**

*Centre for Research-based Innovation (SFI).
**Several applicants replied positive to more than one national funding source, totals are consequently not sums.
Source: Table 4.18 in Godø et al. 2009. Survey to Norwegian FP7 applicants, May 2009.

Better international networks and other added values of the CoE scheme are likely explanations for this success. As remarked by several of the CoE directors, an additional explanation is that the application process for the CoE has given them valuable experience in undertaking large applications. Consequently, they are more prepared for the considerable work involved in an EU grant application. Also the CoE finalists remarked that the application process had been beneficial and contributed to cumulative knowledge in writing applications.

Unfortunately, similar data for the CoEs' success in RCN programmes are not available, as it is difficult to determine from the information in the RCN databases whether or not an application is linked to a CoE.

3.2 Interactions with partners and international research groups

International collaboration

The centres are highly international. All CoEs report that they now have a larger role in making Norwegian research in their field internationally visible than they had prior to achieving CoE status. They have extended their international network and attract a large number of international scholars. Fifteen of the centres report that they have increased their collaboration with internationally leading research groups in their field. The remaining five reply that this collaboration is about the same as before the CoE period (collaboration with internationally leading research groups is a criterion for awarding CoEs). These are both new and old centres and operate in different fields. Fourteen CoEs report that they have increased their participation in EU projects and other internationally funded projects, the remaining six state that it is the same as before (Table 3.1). Of those not reporting an increase, the majority are second generation CoEs which may not yet have had the time to increase their participation in international projects.

Overall the non-consortia CoEs[14] score better on international impact than the CoEs organised in consortia. Regardless of generation and field, some of the virtual centres[15] report no change in their international impact (six of the eleven consortia CoEs are defined as virtual centres). This may indicate that co-location of the research members is important in order to enhance the international impact. However, in order to draw any conclusions here, a more thorough study of the centres with unchanged international impact would be needed; there may be many reasons for lack of increased international impact. The role of co-location is further discussed in Section 3.3.

From the interviews with the CoE directors it is evident that CoE funding renders it possible to maintain and strengthen a network and close collaboration with partners both nationally and internationally. The contacts were already there prior to the centre, but they are now stronger and more active. The funding also creates possibilities for inviting guest researchers and cover travel expenses and other expenses related to participation in conferences etc. Moreover, the long-term funding has enabled the centres to build up strong research environments which further make them attractive partners for other researchers and research groups. This is experienced by several CoEs and they are frequently invited to participate as partners in research calls. One director said: "We have

[14] CoEs without partner institutions/involving only one host institution.

[15] CoEs located at several institutions.

much international collaboration and can pick partners from the upper shelves. This is not because of the CoE status, but due to the research groups' visibility". On the overall level, the long-term funding and its flexibility contribute to strengthening already-existing networks while the status function acts as a door opener to new contacts.

The CoEs' international visibility may also be analysed by the number of scholarly personnel from abroad. Table 3.3 shows that foreigners held 21 percent of the scholarly positions at the centres in 2009. The first generation CoEs are, on average, more international than the second generation (24 versus 15 percent of positions hold by foreigners in 2009). In addition to the foreign scholars included in Table 3.3, the centres report that they hosted 276 guest researchers from abroad in 2009.[16]

Table 3.3 Percentage of scholarly personnel from abroad at the Norwegian CoEs, by position and CoE generation, 2007-2009.

Type of positions	CoE generation	2007	2008	2009
Per cent of Professors and Researchers from abroad	1st generation CoEs	28	26	18
	2nd generation CoEs	14	11	19
Per cent of PhD fellows from abroad	1st generation CoEs	36	32	27
	2nd generation CoEs	6	2	10
Per cent of Postdocs from abroad	1st generation CoEs	45	36	30
	2nd generation CoEs	13	11	14
Per cent of total scholarly positions from abroad	1st generation CoEs	33	28	24
	2nd generation CoEs	11	8	15
	All 21 CoEs	27	22	21
N (Total number of scholarly positions)	1st generation CoEs	805	813	938
	2nd generation CoEs	355	442	490

Source: RCN's key figures for the CoEs.

At some CoEs a majority of the PhDs and postdocs are from abroad, and the CoEs report that it is difficult to find Norwegian candidates. At two of the centres in geosciences, two in engineering and one in the life sciences, foreigners held more than half of the recruitment positions in 2009. However, overall the proportion of foreign PhD fellows at the CoEs is not higher than elsewhere at the universities. In 2009, 26 percent of all persons awarded a doctoral degree in Norway were foreign citizens.[17] This is about the same as the proportion of foreign PhD fellows at the first generation CoEs (27 per cent in 2009, a decline from 36 percent in 2007). The proportion of foreign PhD fellows at the second generation CoEs is substantially lower, 10 per cent (in 2009, increased from 6 per cent in the start-up year 2007).

The success of the CoEs in terms of international cooperation is also evident when we compare replies from the CoE directors and the CoE finalists (see Table 4.1, in Section 4.2.2). Many of the CoE finalists had also experienced increased international

[16] Source: RCNs key figures for the CoEs.

[17] http://www.nifustep.no/English/Pages/STATISTICS/Doctoral%20Degrees/Tablesandfigures.aspx?ItemId=1856&ListId=8252dfaf-6056-4ccc-b6e1-7806d4dc4878

collaboration and visibility since 2005. However, the proportion of finalists which experienced an increase is somewhat lower than for the CoEs: 13 of 18 finalists perceived that their role in making Norwegian research more internationally visible had increased, whereas all the CoEs had experienced an increase in international visibility. Furthermore, 10 of the finalists had increased their collaboration with internationally leading research groups, while seven reported an increase in internationally funded research projects and one a decrease in such projects.

Thus, the international impact is greater for the CoEs than the finalists. Both groups attribute at least part of their success to the CoE scheme, and the scheme's effects on making Norwegian research internationally visible and enhancing international collaboration seems very good. However, some of the CoEs directors alleged that the scheme's focus on internationalisation creates a tension with local needs. In other words: more time devoted to international collaboration can imply less time for local collaboration. This was especially emphasised in small fields within the humanities and is further discussed in Section 3.3.

National, interdisciplinary and industrial collaboration

The CoEs have also extended their national collaborative network. Thirteen report that they now collaborate more with Norwegian researchers outside the centre than they did prior to the establishment of the CoE (Table 3.1). So far, this increase is more marked in the first generation of CoEs. National collaboration has increased for three quarters of the oldest and half of the newest CoEs. Notably all the independent research institutes report increased national collaboration; for these institutions a CoE provides an opportunity to increase collaboration with the universities. Within life sciences, the first generation of centres experience that their investment in new infrastructure (equipment) has enhanced national collaboration. One informant said that the scientific collaboration would have been there independently of the CoE scheme, but not the infrastructure which strengthens the collaboration. Moreover, some centres have realised the value of joining forces in order to enhance their field's status within the Norwegian research system to create more funding options. For instance, two CoEs together with one Centre for Research-based Innovation have applied for infrastructure funding with the aim of developing an infrastructure which all researchers in the field can make use of. As one informant stated "we have realised that we achieve more together than separately". Nevertheless, those who reported that the rate of national collaboration remains the same as prior to the CoE are found in all fields, but it seems like the CoE scheme has contributed to some extent to a raised awareness of the possibilities which national collaboration can create.

A majority of the CoEs have increased their interdisciplinary collaboration (17 increased and 3 "about the same", Table 3.1). All of those reporting that the CoE's research is highly interdisciplinary also report that the interdisciplinarity increased after the establishment of the CoE. In the interviews, the CoE directors that reported increased interdisciplinary collaboration emphasised that even though most of the collaboration existed prior to the

CoE, the intensity is enhanced in such a way that would not have been possible without CoE funding. Furthermore, they emphasised that the possibility to co-localise the different research groups is especially important in this respect. One director noted that regular meetings, workshops etc. provide a basis for cooperation, but that their experience was that proximity – that researchers regularly interact – is important for establishing good cooperation between different disciplines and scientific cultures. The importance of the role of the CoE scheme for interdisciplinary research is fortified by the CoE finalists' responses. Several reported that they had only implemented parts of their research projects which included researchers at their own department and not the other external groups. There was insufficient funding to continue the broad collaboration.

Half of the CoEs have increased their collaboration with industry and other research users such as ministries and international organisations (for instance the World Bank). In particular, the centres in geosciences and engineering have experienced such an increase, but also some of the centres in other fields, such as social sciences. In the geosciences there is a strong tradition for university–industry collaboration, and for centres in this field their increased visibility and recognition have made them even more attractive, both to industry and the general public. Centres within the social sciences experience that their research is more popular in policy circles and they are often invited to give talks. Thus, visibility often has wider effects than the mere intra-scientific, and the CoE funding has sometimes contributed to enhance external collaboration, although this is not a central part of the scheme.

In comparison, substantially fewer CoE finalists have increased their national collaboration and collaboration with industry or other potential research users (see Table 4.1, Section 4.2.2).[18] Hence, the increase in collaboration and interdisciplinarity is greater for the CoEs than the finalists. It is reasonable to attribute the differences to the CoE scheme and to assume that collaboration and increased interdisciplinary research have been enabled by the long-term and flexible funding of the CoEs.

3.3 Organisational issues and strategic impact

Local involvement and impacts

To what extent does the CoE organisation have an impact on the research topics and patterns of local collaboration? According to the CoE directors, the research topics are "somewhat different" from prior research, and local collaboration is as before or increased. Only two of the CoEs, both centres in engineering, report that key research topics are "very

[18] Five of the 18 CoE finalists reported that their collaboration with other Norwegian research groups has increased; one that it has decreased, and the remaining 11 that it is about the same. In terms of interdisciplinary collaboration, seven claim that this has increased after the application process. There are no field differences here. Further, six of the CoE finalists report that they have increased collaboration with industry or other research users. These operate within the fields of chemistry, geosciences, life science and social sciences.

different" from the pre-centre situation. None of the directors answered that it is the same as before. Given the time perspective of the centres and the long-term funding, one might expect that the research topics will change to some extent during the CoE period.

Half of the CoEs report that the collaboration with other research groups/researchers at the host department/institute has increased, the rest report that it is about the same as prior to the CoE.[19] As part of the criticism of the CoEs has dealt specifically with isolation from local activities, it is somewhat surprising that no one reported decreased local collaboration. One explanation may be that measures have been taken to assure some local CoE involvement, and that what is reported in the survey is the present situation, not experiences throughout the CoE period. These measures include, for instance, affiliate programmes, open workshops and seminars and inviting non-centres researchers to meetings with guests. Another explanation might be that the first generation of CoEs is now coming towards the end and the need for anchoring the research within the institutions is much stronger. However, what appears to serve as a strong explanation here is the relation between the centre and its host. When local involvement is compared to the centre's description of the relationship with its host[20] it is evident that those who report a good relation are also those who have increased collaboration with other colleagues at the department/institute. Furthermore, from the interviews with the CoE directors it is clear that the attitudes of the department head are important in nurturing collaboration and integration between the centres and the rest of the institute/department. This is further discussed in Chapter 4. The situation may of course generally look quite different from inside a CoE and in the neighbouring department.

Most of the CoEs reported that they are *more* involved in PhD education than before. Notably, all the CoEs at the research institutes reported increased involvement in PhD education. For these institutions, obtaining a CoE implies more PhD students and more involvement in PhD education. Concerning undergraduate and master teaching, most of the CoEs reported that the activity was at the same level as prior to the CoE status (Table 3.1). Three of the oldest CoEs reported *decreased* involvement in teaching at master/under-graduate level, whereas none of the newer CoEs report decreased teaching. This is the only question where a decrease is reported. Withdrawal from teaching was also emphasised by many informants as a negative experiences of the first generation CoEs as, for example, it created tension with colleagues in the departments (see Section 4.1.2 for a more thorough discussion). Based on these experiences the second generation CoEs has been determined to avoid such tensions and most key personnel, except the director, have retained their teaching obligations.

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[19] The result is the same for the first and second generation CoEs; in each group half of the CoEs report increased collaboration and the other half report unchanged collaboration.

[20] Sources include the questionnaires, self-assessments for the mid-way evaluations and interviews with CoE directors.

Only four of the CoEs report *increased* involvement in teaching at this level, half of these being CoEs at research institutes. Hence, for the CoEs at these institutions the funding scheme not only implies more involvement in PhD education, but also more undergraduate/master teaching. Together, this also increases the institutes' collaboration with the universities, since only they are allowed to award degrees.

Organisational issues

The CoEs are organised in many different ways. There are about as many solutions to co-location as there are centres. Centres are placed at different levels in the host organisation with varying status, and board membership varies widely. The perception that CoEs should be "something special" could explain some of this heterogeneity – and it is noteworthy that most of the deans and department heads wished that the CoEs could have been organised in similar ways as large projects because this would greatly simplify some of the organisational decisions and procedures. Many of the centres themselves probably enjoy their special status, however.

Most CoEs have their own board, regardless of whether they are a consortium or not (Table 3.4).[21] This applies to both generations of CoEs. The majority have also established a scientific advisory board (SAB), and this is more common in the second generation. In the midway evaluation of the first generation of the CoEs the importance of a SAB was emphasised, and this might have affected the second generation of CoEs; this is yet another sign of the impact of the criteria in the midway evaluation.

Table 3.4 Organisation of first and second generation CoEs. N=21.

Organisation		CoE start-up 2003	CoE start-up 2007	Total
Separate CoE Board[22]	Yes	12	6	18
	No	1	2	3
Scientific Advisory Board	Yes, separate SAB	6	6	12
	Yes, SAB same as CoE Board	2	0	2
	No	5	2	7
Localisation	Co-located	8	6	14
	Partially co-located	1	0	1
	Virtual	4	2	6
Consortium	Yes	7	4	11
	No	6	4	10
Type of host institution	University	11	7	18
	Independent research institute	2	1	3

Sources: Questionnaire to CoE directors and the self-assessments provided for the Midway evaluation of the first 13 CoEs.

Even though co-location is the main rule of the scheme, six CoEs are organised as virtual centres. Virtual centres are established for different reasons. One reason is the lack of space at the host institution; another is that some research groups depend upon the local infrastructure and thus cannot be relocated. In general, most CoE directors were in favour

[21] A separate board is mandatory for the consortia CoE and optional for other CoEs.

[22] The role of the CoE Board is discussed in section 4.1.

of co-location. However, the informants desire a certain degree of flexibility. One informant said that co-location is almost always an advantage, although there may be situations where one wants to avoid relocating skills (people). Another informant stated that co-location is difficult to achieve in practice, requiring good leadership skills and someone acting as champion. But the majority emphasised that co-location was important for the interaction between the researchers in the CoE. This was regardless of the degree of interdisciplinarity. Researchers with experience from centres that had *not* been co-located discussed many problems related to this. One natural scientist stated how the lack of success in co-location was probably the reason for the poor synergies between the partner institutions in the centre, because the daily interaction was fairly limited. This informant added that a smaller and more focused centre would have had better opportunities for co-locating. Another reflected that co-location was much more important than they had realised and that they would demand co-location if they were to start up again now. The underlying argument was that sharing office space leads to more sophisticated collaboration strategies.

However, some were not strongly in favour of co-location; these mainly represent the life sciences and some larger natural science fields/faculties. This is probably not a disciplinary effect but rather an effect of the size of the centres – the larger the CoE, the more difficult co-location becomes, with some possible exceptions. One CoE director said that RCN's demand for co-location had been very problematic because the centre was large and connected to two huge departments. Co-location was simply found to be too time-consuming and bureaucratic, although one group from one of the departments was moved after a process lasting two and a half years. Other groups were not moved due to laboratory needs. In retrospect, the CoE director wished that the time could have been devoted to other tasks instead of the issue of co-location. There are different opinions regarding RCN's demand for co-location (se also Section 4.1.4). The demand has benefits and disadvantages. On the one hand, if the RCN is too flexible it might become an argument for the host to not support co-location since it demands much administrative work and reorganisation. On the other, a demand for co-location obviously creates challenges for the leaders; it can be time-consuming and draw attention away from research.

Co-location of researchers has had some notable effects – both questionnaires and interviews reveal that the CoE scheme contributed to changes in the work practice within the humanities. The research within these fields is characterised by individual work, but through the CoE scheme the researchers are now said to be more inclined towards cooperative research. In this respect co-localisation plays a crucial part in order to achieve increased collaboration between the researchers (see also Section 4.2.2). Moreover, the co-localisation has contributed to a change in *attitude* at the senior researcher level – they are now more positive to collaboration.

Taken together, organisational issues such as localisation, and whether the centre is a consortium or not, seems to have an effect on the centre's ability to collaborate with

international, national and local researchers. Furthermore, the centre's relation to its host seems to be very important, not only for local collaboration but all types of impacts. The centres reporting good relations with their host are also those which have experienced an increase along most of the impact dimensions listed in Table 3.1 (that is, obtain the highest overall "score"). Tensions between the host and the centre might impact general attitudes and create difficult working conditions for the researchers within the CoEs. The relationship between the host and the centres is further discussed in Section 4.1 (Section 4.1.3 in particular). However, it can be noted that tensions between the host and the centre are not only created by a difficult host: the attitudes and the leadership abilities of the centre director matters as well.

Size, leadership and leadership recruitment

The size of the centres does not seem to have an impact on any of the variables in Table 3.1. However, from the interviews with the CoE directors it is evident that size is one of the issues which could pose a challenge for both administrative and scientific leadership. Some of the directors argue that large centres are difficult to handle since it is difficult to have an overview of all research within the centre. In addition a large centre poses a risk of losing coherence and clarity of goals. Large centres are found in life and geosciences and a few of the directors said that they would have limited the size of the centre if they were to do it all over again. But they underlined that this is difficult once the research gains new directions and complementary skills and knowledge are needed. Directors of both small and large centres, regardless of discipline, experience difficulties in maintaining their own scientific activity and simultaneously strengthening the scientific leadership. Some worried about neglecting their own research, while others were aware of the large responsibilities and work load involved in leading a centre and thus ready to tune down their own scientific activity.

Another challenge is managing virtual centres. Some of the directors in these centres strived to exercise leadership over personnel located in other departments and in other countries. This may be especially challenging in terms of distributing administrative tasks among the researchers. One director stated that "Half of the members of the 'core group of directors' are international scholars. None of them is based in City X on a permanent basis. They are all fully involved in their home institutions. Therefore, the core group members based in City X all have many administrative duties." Others warranted clarity in terms of personnel responsibility between the centre and the local department: "How should I lead people who are employed elsewhere? I need to be acknowledged as a leader and this is demanding." Yet other directors of virtual centres did not emphasise these types of challenge, thus it is not necessarily a structural matter but rather challenges related to leading autonomous personnel.

It was stated in some interviews that the CoE scheme has contributed to an increased focus on leadership at the university. Informants also emphasised that the CoE scheme coincided with an overall emphasis on leadership at the institutions and that the increased attention

on leadership is not a direct result of the CoE scheme itself, but rather a combination of different influences. For instance, in the past decade several universities have developed scientific leadership courses. Overall this is regarded as a positive trend, as illustrated by one director who stated that scientific management had become more important and that leaders now met and discussed across disciplines.

In the institute sector, models of leadership seem to be more developed and thus pose fewer challenges for these CoEs. One institute director emphasised that institutes have a great advantage in organising centres compared with the universities, where research leadership is normally less well established. Thus, the added value of the CoE scheme in this respect seems to be rather small for the institutes.

When it comes to leadership recruitment, some of the centres in geosciences and life sciences have an explicit strategy of recruiting young group leaders. One director stated that this provides young and aspiring researchers with the opportunity to develop themselves. In one of the centres the young leaders represent the ability to bridge the different disciplines in the centre as the seniors are more socialised into a single discipline. The lack of a tenure track at the university has increased the awareness of the CoE scheme's possibility of providing leadership responsibilities for young researchers, especially in the life sciences. Consequently, young researchers are given leadership opportunities, and in some centres these positions rotate so that leadership does not come at the expense of scientific activity.

Consequently, the structure and the organisation of the CoEs create challenges and tensions in terms of leadership. This is not exceptional for the CoEs as such challenges are present in most organisations. The CoE scheme has, however, contributed to illuminating the role of scientific leadership and provides new opportunities for young researchers which otherwise are said to be nearly non-existent at the universities.

3.4 Media visibility

Measured by the centre director's exposure in Norwegian mass media, the CoE status itself does not seem to give any great increase in visibility. There are notably a few cases in which the centre director has attained much higher media exposure after obtaining CoE status. When excluding these (two) cases from the analysis, the media exposure of the director of the first CoEs has doubled compare to the situation before the CoE was established. However, the averages are low – 1.1 mass media postings per year before the CoEs, and 2.0 after (table below, the period 2002-2003/2006-2007 is analysed separately

as much of the media exposure in this period is about the competition and the establishment of CoEs).[23]

Table 3.5 Media visibility of successful and unsuccessful CoE applicants, number of media exposures in Norwegian mass media 1996/2000-2010

Searches on names of CoE directors and CoE finalists	1996-2001	2002-2003	2004-2010	Total
Directors of CoEs established 2003				
*Total search retrievals	62	49	311	422
Divisor (8 centres x # years)	48.0	16.0	51.2	115.2
Average # media exposure per centre director per year	**1.3**	**3.1**	**6.1**	**3.7**
# search retrievals not including the two centre directors (CBM and BCCR) with the highest media exposure (above 50 hits 2004-2010)	38	23	75	136
Divisor (6 centres x # years)	36.0	12.0	38.4	86.4
Average # media exposure per centre director per year	**1.1**	**1.9**	**2.0**	**1.6**
Directors of CoEs established 2007	**2000-2005**	**2006-2007**	**2008-2010**	**Total**
**Total search retrievals	182	107	308	597
Divisor (8 centres x # years)	48.0	16.0	19.2	83.2
Average # media exposure per centre director per year	**3.8**	**6.7**	**16.0**	**7.2**
# search retrievals not including persons with high media exposure prior to 2006 (two persons with more than 30 hits 2000-2005):	16	26	19	61
Divisor (6 centres x # years)	36.0	12.0	14.4	62.4
Average # media exposure per centre director per year	**0.4**	**2.2**	**1.3**	**1.0**
Non-successful CoE finalists 2006				
***Total search retrievals	688	168	191	1049
Divisor (18 applications x # years)	108.0	36.0	43.2	187.2
Average # media exposure per CoE finalist per year	**6.4**	**4.7**	**4.4**	**5.6**
# search retrievals not including finalists with high media exposure prior to 2006 (two persons with more than 30 hits 2000-2005):	126	56	71	255
Divisor (16 applications x # years)	96.0	32.0	38.4	166.4
Average # media exposure per CoE finalist per year	**1.3**	**1.8**	**1.8**	**1.5**

Source: ATEKST/Retriever. Searches were done 14th May 2010 and included all Norwegian newspapers (79), TV and radio emissions (6) covered by ATEKST.
*Search texts included the names of the Centre directors. Four centres which changed director during the period were excluded from the search, as well as one centre where a search retrieved more than 1000 hits on a person with the same name as the centre director.
**Search texts included the names of the Centre directors, and in 2 cases additional terms (AND (*forsker* OR *professor* OR *universitetet*)) to exclude hits on people with the same names.
***Search texts included the names of the proposed CoE directors, and in 5 cases additional terms (AND (*forsker* OR *professor* OR *universitetet*)) to exclude hits on people with the same names.

Likewise, when comparing the CoEs established in 2007 with the finalists not obtaining CoE status, the CoE status has marginal effect on media visibility as long as the individuals with high media exposure *prior* to the CoE competition are excluded from the analysis. In fact, when the two CoE directors and two finalists with the highest prior exposure are excluded, the average post competition media exposure of the non-successful CoE finalists is slightly higher than the media exposure of the successful CoE finalists.

The most notable effects are found among the researchers with high prior media exposure. The CoE status seems to offer particular opportunities for researchers who are already accustomed to high media exposure. For the CoE directors with a high prior-media exposure we find a large increase in media exposure following the CoE status, whereas for

[23] The figures reported in the RCN annual reports on the CoEs are much higher (with an average around 40 media postings per CoE in 2009). The CoEs wiht the highest media exposure in the annual reports are the same as in our data. The reasons for the higher numbers in the RCNs annual reports are probably that these figures include postings in a broader set of media outlets, as well as postings without the name of the CoE director.

the finalists with similar prior exposure that did not obtain CoE status, such an increase is not found. Note that this conclusion is based on a limited number of cases.

3.5 Main findings

The above analysis shows that, overall, the added value of the CoE scheme is high for its participants. The CoE status functions as a door-opener in the initial phases of establishing the centre and in branding the centre. It is important for creating visibility and gives prestige. The status also implies an implicit expectation that the centre shall become a success, putting extra demand on the centres in fulfilling the expectations. The importance of the status for the centres decreases somewhat in the latter phases when the centre is more established and has gained its own organisational identity.

More important than the status is the long-term flexible funding. The CoE scheme is one of the few funding mechanisms which provides great autonomy for the researchers and offers the possibility for long-term planning. The lump-sum funding creates flexibility in terms of hiring both young and senior scholars in full- and part-time positions rendering it possible to build a strong research community that attracts national and international attention. The questionnaires and interviews with the CoE directors state that the funding has had a positive effect on creating increased interaction between the CoE and other leading research groups internationally (15 of 20 CoEs have increased such collaboration). Furthermore, the funding creates opportunities for inviting guest researchers, increased activity in terms of workshops and conferences and increased funds for travelling. Thus the CoE funding has contributed to strengthening both national and international networks and research collaboration. On the national level there is a tendency for increased collaboration, especially in fields where there is more than one CoE. This contributes to greater specialisation and complementary research. Notably, this tendency is most prevalent in the life sciences and geosciences. For the institutes, however, the CoE has led to more formal collaboration with the universities in terms of PhD and undergraduate and master degree education.

The funding situation for almost all centres has improved after gaining centre status. The majority of centres report an increase in research funding (18 out of 20) and an increase in the ability to attract additional funding apart from the CoE funding (17 out of 20). Additionally, the funding creates opportunities for entering into new funding arenas – especially for the CoEs in the institute sector – which with the CoE funding can provide matching funds in for instance EU grants applications.

Another added value of the scheme is the possibility to create an interdisciplinary unit. Thirteen of 20 centres reported a high degree of interdisciplinary research; only two reported a low degree. Independently of the organisation of the CoE, virtual or co-localised, the funding strengthens the interdisciplinary research. However, many of the

respondents commented that co-localised research groups create stronger synergies and a more dynamic research environment.

The scheme has further contributed to illuminating the important role of scientific leadership at the universities. While some stressed the importance of the scheme in this matter, others claimed that the scheme coincides with generally increased awareness of the importance of leadership at the universities and the development of scientific leadership courses. More importantly the scheme has created opportunities for recruiting young researchers to leadership positions, especially in the life sciences and geosciences. Taken together, the CoEs have lead to new leadership challenges and more leadership positions.

Finally, an interesting finding from the interviews and questionnaires is the correlation between the centre's relationship to its host institution and its achievements. CoEs with good host relations report increased local, national, interdisciplinary and industry collaboration. Where there are strained relationships, the overall score on such collaboration is lower. This indicates that the added value of the scheme is dependent upon the centre's local conditions. This is further discussed in the next chapter.

4 Added value and effects for the surroundings

This chapter deals with the relationship between the CoEs and the wider research system of which they are part. The main section, 4.1, contains an analysis of the relationship between the CoEs and their host institutions. In Section 4.2 we look at the impact of research by analysing the finalists in the second CoE round as well as a more macro-level investigation of research fields with CoEs. Section 4.3 discusses further systemic and long-lasting effects. Section 4.4 summarises the chapter.

It should be mentioned that almost all the discussion concerns those CoEs that are part of the universities. For the three centres affiliated with research institutes, many of the questions about tensions between the centre and the host did not make much sense, and the experiences are largely very positive. For the institutes, CoEs provide opportunities for long-term activities, involvement in teaching, doctoral training and international scientific collaboration – something which their other projects frequently did not allow for. However, a few informants from university-based CoEs mentioned that differences in costs and cost structures complicate collaboration between the sectors, also with CoE funding.

4.1 Host institution relations

The relationship between the centres and their host institution(s) has been highlighted in the midterm evaluations as well as in the questionnaires and interviews for this evaluation. It seems fair to conclude that none of the centres have experienced only positive relations in this respect. All of them have, to very varying degrees, been subject to different tensions. These tensions could explain some of the dynamics we see in the CoE landscape. Not only are there differences between the first and the second generation centres, changes in organisation were made following the midterm evaluation. In addition, there seems also to be a more general learning curve at the institutions; several informants mentioned how they had become more skilled at handling the CoEs at the universities after taking the first experiences into account.

It should be stressed that the relationship with the host institution does not only contain tensions. Some CoE directors praise their host institutions for their flexibility, positivity and confidence in the centre in the first place (despite the fact that some of the applications were not in the core of institutional priorities). Many of the leaders at the institutions are proud of their centres and what they have achieved. In the following, the relationship between the CoEs and the host institutions is discussed under five broad headings.

- Organisational integration: placement in the organisation, board membership, personnel responsibility
- Professional aspects: breadth versus depth/narrowness, teaching duties for centre personnel

- Personal relationships: attitudes towards the CoEs found in key individuals at the host institutions – and vice versa
- Aspects of the CoE scheme itself and the Norwegian science system: the creation of greater differences between individuals and between groups in the science system, formal demands and the "uniqueness" of the programme, recruitment policies and procedures etc.

4.1.1 Organisational integration and local effects

The main thing to note about organisational aspects is how different the CoEs are (see also Section 3.3). The different solutions provide for different degrees of integration of the CoEs into their host institution.

In addition to the physical location (see Section 3.3), the formal organisational relationships are important in a similar way. Some CoEs are organised as separate units outside the faculties; some are units within faculties with more or less formal links to one or more departments; others are organised within a department. Following the midway evaluation of the first generation centres several centres have been moved to lower levels – from the central level to the faculty or from faculty to department level. Not least was this to make issues like personnel responsibility clearer, and the rationales are largely administrative, but also to achieve more professional integration. A few CoE directors, largely from the life sciences, are a bit unhappy with this because it reduces the autonomy of the CoE. Formal organisation thus has several sides to it. On the one hand, centres placed outside of the normal academic structure have some advantages, particularly related to avoiding the normal and exceedingly slow recruitment procedures in universities. On the other, they have many administrative and some professional challenges (discussed in next section), including multiple/shared and complex personnel affiliations. Personnel responsibility, for example, seems to be more easily handled when the organisation is located in a department, and the responsibilities are not too dissimilar from the normal academic pattern. These responsibilities include the personnel responsibility for the people in the CoE in general, the responsibility for the PhD students and postdocs as well as responsibility for the CoE directors. Notably, some CoE directors were concerned about the lack of career plans for all the junior and temporary staff in the second half of the CoE period. The chances for being able to offer some of the most talented a position at the department after the CoE period were perceived to be higher when the centre had formal bonds to a department.

The evidence more specifically points to the importance of involving department heads in the CoE boards – at least as long as the department head is not clearly negative towards the centre. As noted in Section 3.3, there are large variations in the CoE boards. Eighteen out of 21 centres have a separate CoE board; for the remaining centres the department/institute board is also the board of the CoE (two of three here are in research institutes). Board membership also varies. Several of the separate CoE boards include the relevant deans,

vice deans or department heads, often as chair of the board. While some of the boards (6) consist only of representatives from the local institutions, the remaining (12) have a combination of internal and external members. The external members are national or international top researchers or representatives from industry or public bodies. In total, eight of the boards have industrial representatives. The functions of the boards vary; some boards have mainly a symbolic function with no decision-making authority and only an advisory function (most of the local boards); others (two) function additionally as a scientific board. Overall, boards with external members appear to influence the centres in a strategic manner to a greater extent than the boards with local representatives only.

Notably, four of the centres which report a strained host relationship (all together six) have a board composed of only local members (deans, department leaders and partner institutions). Thus, a combination of external and internal representatives appears to be a more adequate solution. Some statements also indicate that the board should have a strategic function and not solely be a reporting body.

4.1.2 Professional aspects

It is clear from the data that the conflicts have been the strongest in the soft sciences. This seems to have different and rather particular explanations. Many are related to the tension between the humanities, this being a very broad field consisting of many small groups and individuals, and CoEs which appear as large centres with sharply focused research programmes. In this setting a CoE is easily perceived as dominating in the discipline and disturbing the fragile balance between scholarly priorities. The CoEs have tried to avoid and remedy tensions by offering affiliate programmes, open seminars, and so forth. The mere size and privileged resource situation of the CoEs may nevertheless deter good collaboration. Such problems should still not be exaggerated. Some informants expressed that there was less problem with envy than they expected in advance, and there were people outside the CoE who empathised that the CoE had a high esteem in their local research community.

There are many indications in the data material that a strained relationship between the centres and the host institutions has been significantly related to the "buy-out" of *key personnel teaching duties*. This practice was more common in the first round and in particular in the humanities (see Section 3.3). Institutional leaders in the humanities expressed significant frustration related to massive reductions in teaching duties for CoE personnel, which meant that the department/faculty was required to find substitute teachers. One of the CoE directors expressed frustration that the department had not been able to find substitutes, meaning that the recruitment to the whole field had suffered during the CoE period. It is interesting that a few of the natural science centre respondents complained that their temporary personnel had not been allowed to undertake teaching (postdocs and PhDs may want this on their CV) because the university feared that they would be entitled to a permanent position.

Whereas strong links to master programmes was emphasised as important for future recruitment across all research areas studied, there were differences in the views on the need for reduced teaching duties for the CoE personnel. In the more individualistic humanities the "time to do own research" is the most valuable resource and an important currency, and this seems to imply more problems regarding combining teaching duties and extensive research tasks. Most of the informants from the life sciences and the natural sciences emphasised that the CoE director (and possibly deputy director(s)) should not have any teaching duties because the leadership position is very demanding,[24] but that this arrangement should not be expanded to other personnel.

4.1.3 Personal relationships and local attitudes

The relationship between the CoEs and their host institution(s) is clearly also dependent upon certain characteristics of the individual directors in the CoEs and, not least, the leaders at different levels in the universities. Both the CoE directors and some of the finalists strongly expressed how a lack of will in the departments and faculties could be detrimental to collaboration. One CoE director stated that positive attitudes from the departments were needed for collaboration to work. Changed departmental leadership led to a reduced conflict level, another stated. A third director explained that the attitudes of the department head spread to the rest of the department, discussing some experience with a leader who made priorities in opposition to the CoE profile instead of "nurturing new initiatives and new competences". A fourth stated that the wrong person in the department head position accounted for much of the failed attempts at interaction with host departments. Finally, a fifth director stated that the CoEs should have a clearer national role and help make others shine, but this of course requires a positive response which was seen as lacking.

Some informants were concerned about lack of positive attitudes at the faculty level and also commented on differences between universities. For example, whereas one university was said to be positive to the CoEs and interested in expanding their fields of research and integrate them in the existing activities, the involved faculty at another university was perceived as rather negative towards CoEs. In another case, the host faculty was regarded as rather hostile towards the CoE, and the CoE director had received signals that some initiatives were taken to analyse to what extent the CoE "impoverished the groups around it" (signals that were not confirmed by the informants at the faculty level). A few CoE directors complained that the universities want the prestige and status that follows from a CoE, but they cannot give it the necessary space because this might hurt someone else's feelings. This dilemma may deter the success of some CoEs. More generally, it was said to be a precondition for the success of a centre that there was someone at the top who helped to implement the plans and was able to act swiftly.

[24] CoE directors "sell the centre externally" and devote much time to managing the centre internally.

It is also clear that leading a CoE is extremely challenging. Most of the institutional informants were positive about the friendliness, competence and approach of the CoE directors, but there are a few exceptions. There were still cases where CoEs were criticised for being self-absorbed and seeing themselves as "pinnacles" or "lighthouses" that did not have to deal with the local community. The different attitudes towards the CoEs indicate both a variety in the CoEs' collaborative/non-collaborative environment, and that the CoEs have different perception of their local role.

As noted in the introduction to this chapter, the CoEs were more smoothly integrated in the research institutes. Here, both the CoE directors and the informants from the institution seemed much more satisfied with the situation, and no tensions related to personal attitudes and relations were mentioned.

4.1.4 Aspects of the CoE scheme and Norwegian research system

Promoting excellence in the Norwegian research system implies particular challenges concerning resource allocation, administration and leadership. A fundamental issue of a large excellence scheme is that it gives some groups a lot of money while many of the colleagues may feel left with little. This easily creates envy and tensions in the research community. As explained above, negative effects of this kind vary broadly, depending on local attitudes and leadership. Many of the department heads and faculty leaders seemed quite proactive in supporting the people not part of a CoE and integrating the CoE in the priorities of the whole department (or faculty). A few were rather negative and seemed almost eager to get the CoE dissolved. These were particularly concerned with "free individual research" and were sceptical to allocating 10 years of support to particular priorities such as CoEs.

A general shortage of long-term research funds was a frequent topic among the informants. Many would have liked to see the "free funds" scheme in RCN to be scaled up in parallel with the CoE scheme to show how these two programmes fit together. It was hoped that this would improve the resource situation for a broader range of research groups and thereby alleviate conditions for envy. Still, calling for more "free funds" is rather typical in large parts of the Norwegian science system and may not have much direct relation to the fate of CoEs.

Moreover, there seemed to be some uncertainty about the requirements of the CoE scheme, in particular related to demands of co-payments (see Section 2.3) and co-location (see

Section 3.3)[25] etc., and this causes local tensions. CoE applicants may perceive that the more host co-payments they can pledge and the better they provide for co-location, the better chance for a successful application. In the aftermath, the host institution may regret some of the commitments in the application.

Problems also relate to limitations in the university administration, budgeting and accounting systems and recruitment policy. There are large differences here and there is a transition to a new budgeting system ("total budgeting") which may have complicated matters. It is still noteworthy that many of the university centres report that it has been administratively challenging to receive CoE funds. On the other hand, many informants also commented how the CoE scheme has contributed to improving the control systems and strategy work at the universities (see also 4.4 below).

4.2 Impact on Norwegian research

Several informants commented that the CoEs were very unevenly spread throughout the system. There are five CoEs with a basis in geosciences, whereas some research fields are hardly involved in any CoE. In the neurosciences "half the people" are in CoEs whereas there are large medical specialties with no CoE. Still, many of the centres are highly interdisciplinary and involve researchers from several fields apart from their core discipline, implying that many disciplines are involved in one way or another. This raises the question of the extent to which the CoE scheme impacts the Norwegian research portfolio, the priorities given specific specialisations and the scope for interdisciplinarity? This is discussed in Section 4.2.1.

How does the CoE scheme impact applicants who are not awarded a centre? Further investigation on the impact on Norwegian research is taken up in Section 4.2.2 where added value for the finalists in the CoE competition is discussed. There has been some concern about male dominance at the CoEs, and measures have been taken to enhance gender equality. In Section 4.2.3 the gender balance at the CoEs are compared with national figures. Section 4.2.4 more generally addresses the esteem and legitimacy of the CoE scheme, and summarises some major criticisms against the scheme.

[25] "The general rule is that a centre is to consist of research groups located in the same place. The term 'located in the same place' is understood to refer to collaboration between research groups or individual researchers that preferably work in the same building complex. The CoE scheme also allows the establishment of 'virtual' centres. A virtual centre is based on collaboration between groups that are not located in the same place, but at a greater or smaller physical distance apart, and which have effective communication systems and systems for exchanging personnel between the various parts of the virtual centre. Virtual centres are required to have a common management and a single research plan that complies with the project description." (RCN 2005).

4.2.1 Impact on research areas

Discussing whether resource allocations to the CoE have had negative implications for other research development, Section 2.4 concluded that CoEs imply harder competition for institutional funds and in some cases reduced resources for other local research groups, in particular personnel resources. Below, impacts on the surroundings are elaborated based on data from the interviews and questionnaires. The discussion is organised according to three overall areas of research: the humanities and social sciences, the natural sciences and engineering, and the life sciences.

Humanities and social sciences

There are three CoEs in the humanities and two in the social sciences, with varying degrees of interdisciplinarity (three of the centres encompass both humanities and social sciences, two are humanities only). These are all among the smallest Norwegian CoEs, each with scholarly personnel accounting for 18 to 24 full time equivalents in 2009.

The data indicate some general impacts of the CoEs on the humanities and social sciences. The scheme has increased the focus on research and the organisation of research efforts into groups. There are also indications of increased competition and task division between the universities, and more emphasis on acquiring external research funds. These changes are most visible in the humanities. Moreover, the selected CoE research fields have profited from the scheme; the CoE money and status has attracted many talented new recruits to these fields, and they are popular among PhD students. So far, there is no evidence that other fields have suffered from this in terms of decreased popularity. There will still be a need to investigate the long-term effects, that is, possible lasting effects on the surroundings after the CoE period.

It should also be noted that the more narrowly focused CoEs so far seem to have had little effect on priorities or resources in their field outside their host institution. It can be claimed that the more specialised a CoE, the less likely a broad *national* impact on the discipline/research area. On the other hand, they contribute much to the *international* visibility and collaboration in the field of the CoE.

As noted in Section 4.1, some of the CoEs have created tensions in their research environment. This particularly concerns CoEs clearly defined within specific research directions or encompassing only a limited part of the research area of their host environment. Such tensions may have different explanations. It may be harder to get acceptance as an “excellence” centre in the “soft sciences” with less clear criteria and traditions for acknowledging excellence – especially concerning recognition from colleagues in other research traditions. Hence, such CoEs may more easily create local antagonism. As noted in Section 4.1.2 however, antagonism does not need to imply that CoEs in the soft sciences are less respected in their environment than the CoEs in other areas. The main problem may be that focused research efforts and priorities are less

common in the soft sciences, particularly in the humanities. Consequently, such efforts more easily create turmoil and antagonism. The centres may be regarded as providing valuable and high quality research, even when causing local antagonism.

Natural sciences and engineering

The CoEs encompass five centres with their core in geosciences, one in chemistry, one in mathematics and three in different fields of engineering and computer sciences. As noted in Chapter 2, in several fields the number of scholarly positions at the CoEs account for a large part of the total number of positions in the field. This indicates high potential for lasting effects on the field. Note however that many CoEs are highly interdisciplinary, which complicates comparisons with national figures. With one exception, all the CoEs within natural sciences and engineering report increased interdisciplinary collaboration compared to the pre-centre situation.

In the geosciences, where there are five CoEs, informants report that the CoEs have affected the scholarly profile of Norwegian research. In addition to increased interdisciplinarity, the research is more quantitative, and personnel with high quantitative competence have been recruited. Norwegian geosciences are also more able to address complex international challenges, and the scheme has further enhanced its international reputation, informants state. One effect of this is that many international recruits are attracted to Norway. However, overall there is not a higher proportion of foreign PhD fellows in geoscience CoEs than elsewhere at the universities (see also Section 3.2). Some institutional informants claim that the difference is that the international applicants to the recruiting positions at the CoEs hold higher quality.

The views varied concerning the competition about the young talent. As mentioned, in several disciplines the CoEs employ a high proportion of the recruits (Section 2.2). Some said there might a shadow-effect related to competition about Norwegian talents in some of the natural sciences, but no concrete examples of negative effects on the surroundings were given. Concerning the competition about the recruitment positions, on the other hand, the effects are clearer. Some other research groups at the involved faculties obtain fewer recruitment positions[26] as a result of the institutional co-payment for the CoEs (Section 2.3). Concerning talent, in some fields the universities have difficulties recruiting Norwegian students as these have good opportunities in industry. CoEs are, however, seen as a more long-term opportunity, giving somewhat better conditions for attracting talent.

More general negative effects for the groups not obtaining CoE status were also discussed in the interviews. Particularly in fields with many CoEs involving a large part of the scholars, cumulative disadvantages may be a problem. For those not affiliated to any of the groups that are defined as excellent the chances of winning future CoE competitions may be lower than for the groups that have already been part of a CoE. The result of the next

[26] Decreased resources more generally were also mentioned by one natural science respondent.

call for CoEs, when the first CoEs are terminated, will provide a test on such effects. More generally, increased elitism was emphasised as an effect of the CoE scheme, and there was some concern that the positive effects of elitist policies need to be balanced against other concerns.

Life sciences

There are six Norwegian CoEs within biology and biomedicine. They encompass some of the largest centres, with an average of 63 full-time scholarly positions per centre. (The smallest life science CoE has 24 full-time equivalents, the largest has 119).

Informants report that the CoE scheme has resulted in increased attention to some research fields within the life sciences and increased the international ambitions in Norwegian life sciences. It has, moreover, given rise to new interdisciplinarity and new networks for innovation.

The CoEs participate in national research initiatives and national cooperation, also including non-CoE groups. However, experience concerning the national and local effects seems mixed. Some life science fields which have not obtained any CoE, report that they fear being disadvantaged in the funding competitions. Some also complain that it has become more difficult to attract young talent to their field as the CoEs appear more attractive to the recruits. There was also a concern about negative attitudes in the CoE's local environment, and lack of local cooperation. On the other hand, there are also researchers outside the CoE who report that there is no increase in the competition for funds, and who see positive effects of the CoEs for the field as such. One such effect is that the time frame and the volume of the CoE research has attracted young talent to undertake research at the university; these are scholars the informants expect that would otherwise have gone to the private sector.

About half the non-successful CoE finalists in 2006 relate to the life sciences. Most find that the scheme has had a positive impact on their own group (Section 4.2.2). Concerning the impact of the CoE scheme on their research field in general, views are more mixed. Two believe that the establishment of large CoEs has impoverished the groups within areas that did not make it to the final CoE competition, canalised more money to groups which were already well-funded, and made it more difficult for others to obtain funding. One believed that it has been an advantage for other groups by reducing the competition for grants from RCN's ordinary programmes. The remaining (majority) has no opinion or state that their research area is poorly funded regardless of the CoE scheme; that is they do not think the scheme impacts other groups. However, the life sciences was that area where the most pronounced concern about impoverished environments was found. Notably, this is an area with several large CoEs with many resources, and likely to affect its environment.

4.2.2 Impact on finalists in the CoE competition

Many of the finalists are very satisfied with their participation in the CoE competition, a participation that has had significant effects for most of them. Most of the finalists have received concrete benefits from their home institution in the form of operating funds and money for PhD and postdoc positions (see Section 2.2). This support is significant in several cases, for example several new PhD and postdoc positions and/or "substantial operating funds" for a period of three years or more. In addition, some have later been successful in applying for other and fairly similar schemes like Nordic centres of excellence and Centres for research-based innovation (SFI).

Table 4.1 Present situation of CoE finalists compared to their 2005/2006 situation.

Please indicate the present financial situation for your research group/your research compared to the situation at time of the application (2005-2006).	Increased	About the same	Decreased	Total replies (N)
Financial situation				
Basic funds/funds from the university/faculty*	12	5	1	18
Funds from the Research Council of Norway	8	6	4	18
Other external funding	11	6	0	17
Network and collaboration				
Participation in EU projects and other internationally funded projects	7	9	1	17
Collaboration with internationally leading research groups in your field	10	8	0	18
Role in making Norwegian research in your field internationally visible	13	5	0	18
Collaboration with industry or other research users	6	11	0	17
Collaboration with other** research groups/researchers at your department/institute	5	11	1	17
Collaboration with other** Norwegian research groups/researchers in your field	9	9	0	18
Interdisciplinary collaboration	7	9	0	16
Recruitment and teaching situation				
Ability to attract young talented researchers	8	10	0	18
Ability to attract distinguished senior researchers	5	10	3	18
Involvement in teaching at undergraduate/bachelor and master level	4	12	2	18
Involvement in PhD education	8	9	1	18

Source: Questionnaire to the non-successful finalists in the 2006 CoE competition. The respondents are the proposed CoE directors/main applicant.
* This table shows financial situation in 2010 compared to 2005/2006. All of finalists reply that they received some institutional funding for the research suggested in the CoE application. Hence, the table shows that even when all received some extra funding for the applied project, in 2010 five of them had the same funding as before, and one applicant had less funding.
**Other=researchers not participating in the CoE applications.

The impact on research collaboration and internationalisation is also extensive. Thirteen of the finalists report that they have an increased role in making Norwegian research in their fields internationally visible; ten stated that they collaborate more with internationally leading research groups in their field; nine expressed that they collaborate more with other Norwegian groups; and seven that they have increased their participation in internationally funded projects (Table 4.1). However, for most of these, the recruitment situation has not improved. Ten report that their ability to attract young talented researchers is the same as before; eight that it has improved. Notably, three report that they are less able to attract distinguished senior researchers, indicating a negative effect of not being designated as a CoE.[27] Five still report an increased ability to attract distinguished senior researchers. Some of the informants who experience an increase in "attractivity" and collaboration

[27] One of these comments that the decreased ability to attract senior researchers is due to increased bureaucracy, not the lack of CoE status. The two others do not give any explanation for the decrease. All CoE directors who replied to the questionnaire reported increased ability to attract senior researchers (Table 3.1).

emphasise that the increase is part of the normal development of their group. Others attribute more importance to their finalist status.

Some of the comments in the finalists' questionnaire point to the beneficial effects of the proposal writing and review process, for example that this has inspired them to think more long-term, strategic or "bigger" about their own research. One humanities informant stated that the CoE application had raised the consciousness within the group of people that applied about the importance of organising research and changed their views towards more group work. Informants in several fields note that it has made writing subsequent applications easier and also increased their visibility and self-confidence. More commonly, the extra funding obtained was perceived to be the main reason for the success. As one of the finalist commented in the questionnaire: "Funding produces activity which fosters more funding and more activity". This may be seen as an effect of the CoE scheme – or it could be interpreted as a more general effect of writing proposal for larger-scale external funding programmes.

It may be added that a few of the runner-ups seemed rather pleased with *not* becoming a CoE. One of these, from the soft sciences, emphasises how the semi-excellence status implied fewer administrative tasks and less responsibility as well as a fruitful pressure on acquiring other funding.

4.2.3 Gender equality

To what extent has the CoE scheme had any effect on gender quality in Norwegian research? After the first CoE competition, where no CoE with a female director was awarded, measures were taken to enhance gender equality in the CoE scheme. In the second call for CoE applications, a strong encouragement to propose female directors and PIs was seen; applicants were asked to state their ambitions for gender equality and the RCN also reserved a separate budget for gender equality measures. Moreover, gender equality was a topic in the midway evaluation of the first 13 CoEs. An analysis of gender equality in the various RCN excellence schemes concludes that the measures taken for the second call have had positive effects on the proportion on female recruits at the second generation CoEs (Forskningsrådet 2009).

When comparing the gender balance within the CoEs with national figures, we find that when using the most updated figures, the overall gender profile of the CoEs does not diverge much from the national structure. However, there are notable differences between research fields (Tables 4.1 and 4.2, commented below). How the CoE scheme may affect the gender balance in Norwegian research in the long run may consequently differ between research fields.

As mentioned, none of the original directors of the first 13 CoE were women. However, since then female directors have been appointed to three of these centres. Of the eight centres which started up in 2007, one has female director. In total, four of the 21 CoEs (19

per cent) now has a female director. This corresponds to the overall proportion of female professors at Norwegian universities (NIFU STEP 2010).

Tables 4.1 and 4.2 show the proportion of females by position and research fields in 2008. In some fields of research the proportion of females at the CoEs is higher than the overall average for Norway; in some fields the female proportion at CoE is about average and in other fields below the field average. In the *life sciences* the female proportions are about average both for senior personnel and recruits (and substantially higher than in many other fields). The CoE in *economics* has succeeded in attracting a considerably higher proportion of female seniors than the field average, and also have a high proportion of female recruits. The CoE in *mathematics* has succeeded in attracting a high proportion of female recruits, but below average among the senior scholars. *Geosciences* and *philosophy*, on the other hand, have above average proportions of senior female scholars, but below average female recruits. The CoEs in *history* and *languages* have below average proportions of females both among the seniors and the recruits.

Table 4.2 Gender balance at the CoEs compared to the research area at large in Norway: Scholarly positions by gender 2008

# CoE	***Field of research/kind of research institutes	Scholarly positions 2008			
		At CoEs		Overall figures for relevant universities* and institutes	
		# total positions (excl. PhD and Postdocs)	% females	# total permanent positions	% females
1	Chemistry	12	16.7	90	17.8
1	Economics	28	35.7	96	12.5
4	Geosciences	166	16.3	140	10.7
	Physics (several CoEs also relate to physics)			144	13.9
1	History	10	20.0	122	30.3
1	Linguistics and Literature	7	28.6	218	54.1
6	Life sciences	159	30.2	566	29.5
1	Mathematics	36	2.8	134	12.7
1	Philosophy	15	33.3	169	26.0
2	Engineering and Computer and Information Science	24	4.2	435	8.7
1	National Social Science Institutes**	37	27.0	577	43.2
2	Technological and Industrial Research Institutes***	86	10.5	1537	22.4

Sources: Figures on CoE are from RCN. Overall figures are from the NIFU STEP Register of Research Personnel.
* Figures on the 10 fields of research include the five universities which host CoEs: NTNU, UiB, UiO, UiT and UMB.
*'Includes 11 institutes included under the heading National Social Science Research Institutes in the "Key figures on research institutes" in the national R&D statistics (http://foustat.nifustep.no/nifu/?language=en).
**'Includes 15 institutes include under the heading Technological and Industrial Research Institutes in the "Key figures on research institutes" in the national R&D statistics, and in addition Simula Research laboratory/Simula School of Research and Innovation.
***Some adjustments in the standard categorisation of departments were made to assure that all relevant research units were included (that is, multidisciplinary departments units are included under their most relevant CoE research field). "Linguistics and literature": There is no CoE within literature, but the classification of the university departments does not allow figures for linguistics only.

Table 4.3 Gender balance at the CoEs compared to the research area at large in Norway: PhD fellows and Postdocs by gender 2008

# CoE	***Field of research/kind of research institutes	PhD fellows 2008				Postdocs 2008			
		At CoEs		Overall figures for relevant universities* and institutes		At CoEs		Overall figures for relevant universities* and institutes	
		# total	% females	# total	% females	# total	% females	# total	% females
1	Chemistry	2	0.0	101	41.6	7	28.6	37	27.0
1	Economics	4	50.0	45	48.9	4	75.0	19	47.4
4	Geo sciences	88	31.8	158	37.6	44	36.4	62	30.6
	Physics			149	24.2			50	24.0
1	History	6	33.3	77	46.8	9	44.4	26	57.7
1	Linguistics and Literature	9	44.4	87	58.6	1	0.0	22	72.7
6	Life sciences	157	60.5	580	63.4	115	48.7	252	48.8
1	Mathematics	40	37.5	117	26.5	18	27.8	28	17.9
1	Philosophy	8	12.5	38	31.6	6	16.7	19	57.9
2	Engineering and Computer and Information Science	62	25.8	689	26.1	23	26.1	145	32.4
1	National Social Science Institutes**	11	63.6	61	60.7	1	0.0	9	44.4
2	Technological and Industrial Research Institutes***	37	27.0	117	30.8	23	34.8	63	27.0

Sources: Figures on CoE are from RCN. Overall figures are from the NIFU STEP Register of Research Personnel.
*Includes the five universities which host CoEs: NTNU, UiB, UiO, UiT and UMB.
*Includes 11 institutes include under the heading National Social Science Research Institutes in the "Key figures on research institutes" in the national R&D statistics (http://foustat.nifustep.no/nifu/?language=en).
**Includes 15 institutes included under the heading Technological and Industrial Research Institutes in the "Key figures on research institutes" in the national R&D statistics, and in addition Simula Research laboratory/Simula School of Research and Innovation.
***Some adjustments in the standard categorisation of departments were made to assure that all relevant research units were included (that is, multidisciplinary departments units are included under their most relevant CoE research field). "Linguistics and literature": There is no CoE within literature, but the classification of the university departments does not allow figures for linguistics only.

4.2.4 The esteem, legitimacy and criticisms of the CoE scheme

The CoE scheme is generally highly regarded by the informants; they think it benefits Norwegian research and want it to continue. The scheme improves the conditions for long-term basic research and enhances the international visibility of Norwegian research. Moreover, promoting excellence has become more legitimate policy. Overall, the informants perceive the increased emphasis on excellence and support for high quality research to benefit the Norwegian research community.

Only a couple of the informants would like the scheme to be replaced by other policy measures. One of the finalists in the 2006 CoE competition considered that the large resources allocated to the centres impoverished their surroundings, and would like the scheme abolished or replaced by a more modest funding scheme for smaller groups (not centres). Some informants at one of the host universities emphasised that the scheme inhibited institutional autonomy. (Apart from that, their perception of the CoEs benefits for Norwegian research was much the same as at the other institutions.) Instead of centres selected by RCN, they would prefer more general funds for the institution providing them with the opportunity to determine their own research priorities and to establish their own centres.

As discussed elsewhere, there are some distinct criticisms of the terms and effects of the scheme, also among those who would like to maintain a national competition and CoEs selected by RCN. There is some concern about the host institutions' commitments for co-payments (see Sections 2.3 and 2.4; commitments concerning the post-CoE period are discussed in Section 4.3). All institutions agreed that they should commit some institutional resources to the CoEs, but not all institutions thought the commitments had been properly balanced against other needs. There is, moreover, much concern for improving the relationship between the centres and their local environment, and much of the local learning has dealt with how to find a good balance between centre independence and local integration (Section 4.1).

There was also some criticism of the CoE selection procedure which may affect the esteem and legitimacy of the scheme. The selection criteria were clearly stated in information to the applicants. Some informants still think that not all general concerns affecting the selection of the centres are listed among the official criteria, or they think some criteria are interpreted to the disadvantage of some research fields. Some of this suspicion relates to the organisation of the selection process. Each application is first assessed separately by three international experts. Then applications in all different fields of research are assessed and ranked by *one* international multidisciplinary committee (with 11 members). The dissatisfaction with the process concerns lack of expertise in specific research fields in the multidisciplinary committee (or competence to assess/interpret the expert reviews), how different fields of research are compared (some suspect engineering is bound to lose against basic life sciences, or soft sciences to lose against hard sciences), or that concerns other than excellence affect the selection (for example, a "fair" distribution between institutions and research areas). More specific criticism also addressed lack of transparency in the selection process, and that applicants had no possibility of communicating with the selection committee or to respond to the expert reviews prior to the final ranking process. The organisation of the CoE selection process is further discussed in Chapter 5.

4.3 Potential for lasting effects

Systemic effects

Several effects on the Norwegian science system can be seen. It is fair to conclude that the CoE scheme has led to a clearer competition and consequently work division between the universities in Norway. One of the runners-up in the natural sciences commented on how the CoE programme has increased competition between the different universities in Norway: "This has led to us all becoming better. The professional development [specialisation] we have had in our field would not have occurred without the CoE scheme." This was confirmed by respondents from the soft sciences: "We see that University X and University Y have now become much more specialised in the broader field of learning [...] and also that University Y and University Z really have pulled themselves together to be able to compete with us" and life science: "City X and City Z are now complementary and have specialised in different directions." In other words, it is clear

that the CoE scheme has had a lasting effect on how competition takes place within the Norwegian science system, and subsequently on processes of strategy-formulation at the institutions. Interviews and questionnaires point at a positive learning curve for the universities which may be seen by the many changes taken along the way in how the CoEs are organized and governed. As mentioned, many informants also emphasised how CoE funding has encouraged more systematic thinking around leadership and personnel responsibilities, group work and collaboration.

Most of the respondents also mentioned the important role of the CoEs as signalling devices to the outside world that Norwegian science has some really state-of-the-art research groups, and also that this could provide inspiration and inspire ambition for other Norwegian scientists. Heightened ambitions were mentioned by many. One stated that the CoEs had raised the bar in Norwegian research, and that most of the research community were proud of that. The international visibility was said to be increased, and it was emphasised that more foreign researchers had been attracted to Norway.

More generally, the CoEs give increased collaboration and internationalisation. The CoEs are attractive partners for other research groups nationally and internationally and lead to more collaboration (Section 3.2). Many foreign guest professor and junior scholars increased their collaborative links with Norway through the CoE scheme. This is likely to have lasting effects of the collaborative patterns of Norwegian research.

A few informants discussed in more detail how the CoEs have affected their respective fields of learning. Some emphasised how the CoEs have opened up new interdisciplinary areas and/or expanded the field in new directions, for example more interdisciplinarity and increased capacity to tackle specific challenges. Others commented how the nature of the field was influenced, and believed the CoEs to be organisations with means to affect the whole field nationally. A few informants discussed how the high visibility and the scientific profile of the centres also have facilitated university-industry interaction (see also Section 3.2).

Plans for the post-CoE period

The Terms of Reference ask whether host institutions have satisfying strategies for how to take care of the values created in the CoEs after the CoE period has ended. Their ability to continue research activities and make use of the competence acquired, is important for the lasting effects of the centres. The interviewed informants at the host institutions generally seem very concerned to facilitate continuation of activities and assure that that their research groups are able to benefit from the created values. At the same time they do not want CoEs to hamper the dynamics of science or reduce the financial autonomy of the

institution.[28] This implies that they do not want to make long-term financial commitments for former CoEs. They saw their role as a facilitator for integration of the centres into the ordinary activities and organisational structure, and assisting in finding external funding. How well-integrated centre activities are in institutional plans and strategies varies. At some institutions the CoE field of research is part of defined priority areas at the institutions, and there are well-defined strategies for the post-CoE period. At other institutions there are few strategic commitments. Plans for maintaining activities and competence also vary within institutions depending on how involved the faculties and departments are in the CoEs. At one faculty concern was expressed (at the departmental level) that responsibilities were not clearly defined, and the result might be that everybody waited for someone else to take responsibility for the post-CoE period. Notably the plans for the first generation CoEs (ending in 2012) are defined much more clearly than the plans for the second generation CoEs (ending in 2016).

The CoE directors themselves seem well prepared for the post-CoE period. Most are optimistic about external funding, and believe that a large part of the activities will continue. Some of the larger CoEs are likely to remain as separate organisational units, and several are already assured some external funding for extended actives. The director of one of the largest CoEs stated that the CoE funding was a small part of their total funding and that they would be able to manage without it. Four of the seven interviewed CoE directors of first generation centres said there were plans for a new CoE application (based on new research plans and at least part of the same researchers).

A large part of the senior personnel hold permanent positions at the host institutions and will continue their research activities at their previous department or an interdisciplinary unit with links to several departments. Maintaining interdisciplinarity was a major concern in the discussion of how to integrate the CoEs activities in the ordinary structure, and generally perceived to be feasible within a departmental structure when organised as a large project with external funding. Maintaining the activities of the CoEs organised as consortia was perceived to be more challenging and more reliant on long-term external funding.

Concerning the PhD candidates' and postdocs' possibilities of continued research at the institution or in Norway, the CoE directors' estimates vary. Some centres address a broader national academic labour market and their recruits are also attractive in the private sector. Here the CoE directors were quite optimistic and believed their candidates to be competitive and that most or all of them would be able to get a position in Norway. Some also expected that many of their foreign recruits would remain in Norway yielding a net import of researchers in the long term. Other centres are more specialised and/or the

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[28] The RCN visited all first generation CoEs in 2009 to discuss the plans for the post-CoE period. The Council concluded that the centres had different needs, but that some general priorities would improve the institution's ability to maintain the values created: increase in the budgets for the RCN independent projects programme and increase in the basic funding for the institutions.

national labour market is small. Especially for some of the CoEs in the humanities, it was emphasised that not many of the recruits could hope for a future research career in Norway, but they were expected to be competitive on the international marked. These fields generally also have fewer external funding options and emphasised that they needed to be adaptive when planning for the post-CoE period, including a broader research agenda and more interdisciplinary collaboration. At the independent research institutes some emphasised that they did not expect to be able to continue to do much basic research after the CoE period, but were well prepared to do applied research in the CoE field.

Also in other fields a few centres reported a lack of options for external funding, for example funding to cover specific needs for technical support personnel. There are, moreover, some concerns about resources for continuing the master programmes in which the centres have been involved since there are no external funding options for such programmes. Thus, there are activities for which few other funding schemes than CoEs provide an opportunity.

National fertilisation and PhD schools

Some of the informants were somewhat sceptical about the long-term effects because the CoEs were seen as very specialised. In the humanities, for example, the huge build-up of activity within a rather narrow field, and large-scale international recruitment were seen as problematic for a field of learning with a broad and heterogeneous knowledge-base and many teaching programmes in the Norwegian language.

The respondents offer very different solutions to these problems. Some seemed rather sceptical about the overall idea of CoEs; others merely wanted the scheme to be more flexible and allow for smaller centres (in terms of funding and number of people) or centres with a slightly shorter duration than two times five years. Yet others emphasised that centres should be based on quality alone, and not selected for their local and national effects, adding that the winners could still be requested to have a plan for fertilising their field both nationally and internationally.

Another issue concerning national fertilisation and lasting effects are graduate/PhD schools. A few of the CoEs are responsible for such schools, or are a part of cross-institutional initiatives. Most of the informants expressed reluctance towards tying CoEs more closely to PhD schools. The two main arguments were that PhD schools need to be based in organisations with a time perspective longer than 10 years, and that PhD schools would lead the CoEs to become too permanent and institutionalised. PhD schools need to be cultivated from the very core of the universities, one life-science professor remarked. Research education is still an important task for the CoEs, and their contributions to PhD programmes and supervision was highly appreciated.

4.4 Added value and effects for the surroundings: main findings

The CoEs are extremely heterogeneous and their environments vary so much that it is difficult to come up with very clear and generalised conclusions about their effects on and interplay with the wider research system. Of course, they all have distinct names, an elitist identity and separate boards, and most often a scientific advisory board, but this is also sometimes the case with other (large) externally funded projects. It is clear that all CoEs (excluding those in the research institutes) have experienced some degree of tension with their local institutional environments. This is not necessarily negative; it could be claimed that establishing new, ambitious, large-scale and internationally-oriented activities will always create tensions. Many CoEs are bottom-up initiatives emerging in internal processes that may or may not be explicitly tied to institutional priorities and strategies – although the tendency is that they increasingly are, or should be. The problematic aspects have, for example, been related to buy-out of teaching duties, co-funding and other aspects of local integration and collaboration. Particular challenges with local integration are found in the soft sciences where the notion of group-organised, 10-year and fairly narrow research efforts is still alien to some environments.

If tensions are unavoidable, the question then becomes how the institutions have handled them. Here the data material reveals an enormous variation – from the most frequently-found positive attitude towards the CoEs in institutional, faculty and departmental leadership, to poorly disguised negative attitudes, especially at lower levels of the university managerial hierarchies. Many of the tensions are not related to personal issues and preferences but rather to problems for the universities in handling the administrative aspects of CoEs. These are, for example, related to questions such as who should have personnel responsibility for juniors and seniors, how should the co-funding be organised and carried out in practice, how should publication credits for CoEs be distributed, where in the organisation and on campus should the CoEs be placed, and who should comprise the university representatives on the board. The data indicate that it may be beneficial to have both external and internal members in the boards and that relevant department heads should be among them unless they are hostile to or in direct competition with the CoE.

Universities have taken the tensions seriously and we see considerable reorganisation among the CoEs. The general trend is that they are organised closer to the department level, included in strategic plans and priorities at departments and faculties, and that the effort to create real co-location has been increased. As such, the CoE scheme seems to have had a significant impact on the long-term planning and thinking of the universities. Although the general message is that co-location is very beneficial, informants warn against making this a rule because it will sometimes be counterproductive.

The research institute CoEs have not had the same type of impact, largely because the administrative system in this part of the research system seems to be operating fairly well.

In this sector, the most important added value is probably associated with tying the scholarly activities of the institute more closely to the education system by getting the centres strongly involved in master and PhD teaching.

For all CoEs the impact is noticeable with respect to increased international and most often national/local collaboration including outside of the scientific community, international recruitment and more. This happens regardless of the sector in which the CoE is found, but may be a function of age (the older centres report many more such added values). The impact on gender equality is probably very modest, although the centres seem to have taken demands of equality – and other aspects pinpointed in midway evaluations – very seriously.

Scholarly effects in Norway also vary, and there is naturally a broad difference between a CoE in a very large field of science and a CoE in a much smaller field. Our assessment remains that many of the effects discussed in this chapter (and also in Chapter 3) are lasting – not least the more structural and institutional changes in the Norwegian science system that have tailed the CoE scheme and similar programmes. This is therefore most likely not just an effect of the CoE scheme alone, but rather a result of a broader trend with other types of centres, priorities and concentration of resources.

5 Overall conclusions and recommendations

5.1 Conclusions: impacts and added value of the CoE scheme

When taking all the data into consideration, the impression of the Norwegian CoE scheme is very positive. It is particularly successful in terms of promoting researcher recruitment and strengthening the internationalisation of Norwegian research. There is also an increase in national and interdisciplinary collaboration. The informants point to the long-term and lump-sum funding as a major premise for this success. The funding enables building strong research environments and attracting highly qualified scholars. The excellence status is especially important as a door opener in the initial phase of the centre: for attention, visibility and support.

The combined effect of the excellence status and the space of autonomous action provided by the long-term funding is very powerful when it comes to acquiring additional funds. The additional funds of the CoEs are extensive. On average, the CoE funding from the Research Council of Norway (RCN) accounts for only 20 per cent of the total income of the centres. The institutional co-payments accounts for 24 per cent, whereas 17 per cent comprise additional RCN funding and close to 35 percent other external funding. This means that the CoE scheme contributes to a considerable accumulation of advantage (referred to as the Matthew effect in the literature, cf. Merton 1968), at least when it comes to funding and personnel resources. This is not necessarily an unfair advantage, and we have not found evidence that other researchers in the same fields generally are worse off due to the CoEs.

The analyses of impacts on the surroundings point to some concerns about strained relationships to host institutions and harder competition for internal funds – in particular funds for PhD positions. There are possible negative implications for other Norwegian research groups, not least when scientific talent is in limited supply, as well as positive impacts on Norwegian research through spillover effects and long-term benefits. These implications and impacts are elaborated below where each paragraph provides summary answers to questions in the evaluation assignment.

"How are the CoEs different from other ordinary research groups?"

In many respects the CoEs are different from ordinary Norwegian research groups. Some are relatively large and consist of several groups. Their average size in 2009 was 68 scholars per centre accounting for 44 full-time equivalents. The CoEs have higher proportions of PhD positions, part time affiliations and guest researchers than ordinary research groups.

As indicated in the introduction to this chapter, the CoEs have more external funding and generally better financial terms than most other research groups. They are temporary

organisations for a fixed 10-year period (with the threat of being terminated after the first five-year period if they do not succeed in the midterm evaluation). They are more interdisciplinary than ordinary groups within disciplinary departments. The centres within the humanities have more emphasis on collaborative work and scholarly leadership than usual in their field. Yet, the CoEs are not too different from other interdisciplinary centres organised at the universities. There is also a tendency that the later CoEs are organised closer to the department level and in the same manner as other large-scale externally funded projects, which contributes to "normalising" the centres. As the host institutions become more experienced with CoEs and similar types of funding (SFI, FME etc.), they seem to have become more conscious in the way they define how CoEs should be similar to – and different from – other research units.

Added value

- *"What is the significance of the CoE status?"*

The excellence status is very important to the CoEs. Because the funding scheme basically requires the build-up of a new academic unit, the status becomes important in acquiring institutional and external support in the early phase. As seen, the status also helps in securing additional funds and in attracting highly qualified scholars and partners in a build-up phase.

We also see that the CoE status and the preceding application process serves as a tool for entrepreneurial academics and bottom-up initiatives in the research system. By getting the stamp of quality of being a finalist, not to mention a winner, the initiator(s) of a proposal can use this in institutional-internal struggles about priorities and strategic direction.

- *"What are the interactions between the CoE and other leading research groups in their respective fields internationally?"*

The overall impression is that the CoEs are highly international. The CoE funding strengthens collaboration through international projects, senior researchers in part-time positions, guest researchers and generally increased funds for conferences and travel. All the CoEs report that they have increased their role in making Norwegian research visible internationally. Most also report that they have increased their collaboration with internationally leading research groups and participation in internationally funded projects.

Some of the CoEs consist of highly international research groups and some recruit the majority of their PhD fellows from abroad. At two of the centres in geosciences, two in engineering and one in the life sciences, more than half of the recruiting positions were held by foreigners in 2009. However, overall there is not a higher proportion of foreign PhD fellows at the CoE than elsewhere at the universities.

- *"Have the CoEs had impact on scientific leadership and leadership recruitment?"*

Many researchers have been recruited to leadership positions (group leaders and similar) at the CoEs. Especially in the life sciences and geosciences, where there are many CoEs, the CoEs offer more career opportunities. The CoEs imply both new leadership challenges and more leadership positions. We see that the organisation of CoEs has been the subject of what is often a fruitful discussion about leadership and personnel responsibilities in the universities. There are, however, several structural challenges related to this, not least how the institutions handle temporary personnel. The practices seem to vary for the different CoEs.

- *"Has the organisation of CoE research had any impact on gender equality?"*

Taken together, the present gender profile of the CoEs does not diverge markedly from the overall figures for Norwegian research. There are notable differences between research fields, however. In some fields of research the proportion of females at the CoEs is higher than the overall figures for Norway; in some fields the female proportion at CoE is about average and in others below the field average (see Section 4.2.3). How the CoE scheme may affect the gender balance in Norwegian research in the long run may consequently differ between research fields.

After the establishment of the first CoEs there was some concern about few women at the CoEs, and measures were taken to enhance gender equality in the scheme. These measures seem to have had positive effects. Also other requests in the midterm evaluation, like the degree of Norwegian/foreign postgraduates or aspects of the scientific activities, seem to have been taken seriously by the centres.

- *"Does it matter for the added value whether or not the host institution is a university or an independent research institute?"*

There are clear differences between the research institutes and universities in how they profit from hosting a CoE. For the institutes, the CoEs provide opportunities not frequently given by their other projects. CoE funding allows long-term projects, basic research and more international scientific collaboration. CoEs also provide more opportunities for involvement in teaching and doctoral training. Along these dimensions, the added value is higher at the research institutes than at the universities. This is natural, as the institutes need to reinforce linkages to higher education institutions since they cannot grant degrees or organise systematic education themselves. For the universities, on the other hand, impact on research administration and strategy is clearly higher than at the research institutes (see below).

- *"Does it matter for the added value whether the CoE is situated in one location or is based on collaboration between groups that are not located in the same place?"*

The data indicate that co-location of the research members can be important in order to strengthen the synergies and to create a dynamic and collaborative research environment. A notable observation is that some of the centres which are not co-located report less

international impact. However, for some of the larger centres in the life sciences and the natural sciences, (complete) co-localisation was not perceived as important or feasible due, for example, to the large number of people involved or the dependency on research infrastructures located in different places. In other words, the evidence clearly points at co-location as a very good principle, but that it should not be implemented at any cost. Guest offices for partners and groups located elsewhere, as well as for part-time personnel, are reported to improve integration when co-location is not feasible.

Impact on surroundings

- *"Do the resource allocations to the CoE have negative implications for other research development?"*

The data indicate that the CoEs imply harder competition for the institutional funds and in some cases reduced resources for surrounding research groups, in particular personal resources. At about half the involved institutional units the informants believed the institutional co-payment for the CoEs implied fewer resources for other groups at the institutions. In two cases the CoEs were perceived to have a positive financial net effect on their local research environment. Concerning financial impacts outside the CoE institution, data are more limited. Analyses of personnel resources in the relevant research areas show that the CoEs employ a large part of the research recruits in many areas, indicating both present impact on resource allocations, and a potential for lasting effects on the research field. They also account for a large part of senior and research positions in several fields. Whether or not this has enduring negative implications for other research groups cannot be concluded from existing data, but requires further analysis after the completion of the first CoE period. It should be added that the CoE scheme has had *positive* financial impacts for the non-successful finalists. These groups have received substantial funding from their own institutions as a result of their CoE finalist status, and a large part of these have also increased their RCN funding.

The implications probably also vary with field and speciality and not least the availability of scientific talent within these. If such talent is a scarce resource, the negative implications may be felt more strongly than if there is an adequate supply of young people interested in a scientific career. In some places the competition for talent has most likely intensified. Still, it is noteworthy that some of the CoEs state how they have been able to use their status to attract individuals who would otherwise have gone into industry or other non-academic careers.

- *"How are the centres perceived by their host institutions? Does this vary with the type of host institutions involved?"*

Among the institutional leadership the CoEs, and excellence more generally, are given high priority. The CoEs require extra time and resources to organisation and administration, but the host institutions still welcome the centres and believe them to be worth the extra effort. Some also emphasise that they profit from the extra organisational

and administrative efforts more generally, that they learnt from the establishment of the first CoEs, and now are better able to organise both CoE and other projects. Also within their local environment the CoEs seem to be highly regarded and something the colleagues are proud of.

Nevertheless, there are several examples of strained relationships between centres and the local environment. Strained relationships seem to arise from a variety of circumstances, including "buy-out" of key personnel teaching duties, centres perceived to disturb the balance between scholarly priorities, personal relationships and attitudes, and leadership abilities. Some of the interviewed institutional representatives were less enthusiastic about CoEs – they were negative towards the extra efforts and resources needed, or critical of their performance. There were also examples of strained relationships involving department heads. Such variations in the local attitudes obviously affect the institutional efforts in planning for and assisting the CoEs. It is not realistic to pay attention to personal attitudes and likes/dislikes when designing research-funding programmes. This is nevertheless an aspect that the host institutions need to take into consideration, for example in strategy-formulation and in organising and governing the CoEs.

For the CoE at research institutes the experiences with hosting CoEs are largely very positive. These are flexible organisations where the administration of a centre involves fewer extra concerns and less tension compared to the universities.

- *"What are the interactions between the CoE and other leading research groups in their respective fields nationally?"*

To a certain extent the CoE scheme has increased national collaboration, especially in those fields where there is more than one CoE. Here, there is extensive collaboration between the CoEs. Collaboration with other national research groups has also increased, largely due to the funding which enables the centres to strengthen their national networks. Compared to the pre-centre situation, two out of three of CoEs and half of the CoE finalists report that they now collaborate more with other Norwegian groups in their field.

- *"What are the interactions between the CoEs, their host institutions and partners?"*

Contrary to what might be expected, no CoE reports a decrease in local collaboration (half report that their collaboration with local research groups outside the centre is increased, half that it is the same). This indicates that effective measures have been taken to meet the criticisms that the CoEs are (have been) isolated from local activities. The fact that the first generation CoEs are now in their final years and need to plan for the post-CoE period also motivate better anchoring of the research within the host institutions. The measures include affiliate programmes, open workshops and seminars and inviting "external" researchers to meetings with guests.

Several findings indicate that the host relations are important for the CoEs. There is a notable correlation between the centre's relationship to its host institution and its

achievements. CoEs with good host relations report increased local, national, interdisciplinary and industry collaboration. Where there are strained relationships, the overall score on such collaboration is lower. Furthermore, from the interviews with the CoE directors it is clear that the attitudes of the department head are important in nurturing collaboration and integration between the centres and the rest of the institute/department. In general, we see that the boards of the CoEs should ideally have representatives of the involved departments, and that they also should have external members.

- *"Have the CoEs made any strategic impact on the host institutions with respect to their research policy or research organisation?"*

The CoEs are reported to have positive effects on the university's ability to make priorities and organise research, and the appreciation of scholarly leadership. For some universities the CoE scheme has contribute to enhanced awareness of the importance of strategic priorities. For others, which already had developed clear strategies of prioritisation, it has re-enforced already-established practices.

Whereas the CoEs have led to increased attention to and "enforced" learning in research organisation and management at the universities, the research institute CoEs have given rise to few new challenges and consequently less impact in this respect.

"Is it likely that the CoEs have created lasting effects inside and/or outside their host institutions?"

It should first be mentioned that the most important lasting effect is, hopefully, the scientific activities and the researcher training that the centres have accomplished. Also the high degree of internationalisation, including PhD students who will have a career elsewhere but strong ties to Norway, will likely have lasting effects.

The data indicate that the CoE scheme has led to a clearer competition and consequently work-sharing between Norwegian universities. The CoE are perceived as signalling devices for the outside world for where to find state-of-the-art research groups in Norway. The scheme has led to heightened ambitions and aspirations both for the involved groups and for other groups trying to qualify for the scheme. It could, perhaps, be claimed that the CoEs have pinpointed an academic ideal that may be new in some parts of the Norwegian academic system: the researcher with a strong international agenda, local collaborative orientation in units with clear leadership, significant involvement in training of young researchers and high productivity.

There seems to be a high potential for further improvement and lasting effects on research strategy and organisation of research at the universities.

5.2 Recommendations

Our recommendations for further improving the CoE funding scheme include how to organise the selection of centres, the overall terms and organisation of the scheme, as well as how to prepare for the post-CoE period.

Selection of CoEs

1) *The RCN should respond to dissatisfaction with the CoE selection process and consider reorganising the work of the international review committee.*
   Among the informants there was some criticism of the CoE selection procedure relating to a perceived lack of competence in specific research fields in the multidisciplinary committee. Moreover, some fields of research were regarded as disadvantaged in the final ranking of applications. Some thought that the selection criteria favoured specific research fields but was a disadvantage for others. For instance, more technologically-oriented fields were not assessed as sufficiently "basic". There was also suspicion that concerns other than those defined in the guidelines affected the selection, geographical location for example. Moreover some informants criticised the lack of transparency in the selection process, and that applicants had no possibility of communicating with the selection committee or to respond to the expert reviews prior to the final ranking process (see Section 4.2.4).

   One way to better enable all fields to compete on their own terms and assure more expertise in the ranking of the applications would be to split the multidisciplinary committee into review panels for each of the major research areas (e.g.: life sciences; natural sciences and engineering; humanities and social sciences). Since interdisciplinarity is an important aspect of the CoEs, the number of panels needs to be small, and interaction between the panels should be facilitated. Having separate "area panels" requires explicit prioritising between research areas. Other countries with similar funding schemes, such as Sweden's Linneus grant, have predefined budgets for selected fields of research and one sum reserved for flexible use. If the RCN does not wish to predefine budgets for different research areas, a final ranking list including all research areas may be created by a separate committee with a more specific mandate than the expert panels. Such a mandate could, for example, be to focus on the subset of applications which needs to be compared in order to reach a conclusion, and to assess the expected local and national impacts of the proposed centre, and to assess the contribution to national cooperation and work-sharing as well as other important features of the proposals that do not require expertise in the specific fields of research. Measures to enhance the transparency of the review process should also be considered, for example inviting applicants to respond to the individual expert reviews before the final ranking process. Overall, separate area panels, a clear mandate for comparing research areas and applicant replies to the expert reviews, would assist in ensuring equal possibilities for research areas and enhance the transparency and legitimacy of the selection process.

2) *Host institutions' priorities and willingness to support CoEs are vital to their success. When selecting CoEs, the expected lasting values of the centres should be part of the assessments, but host commitments to allocating internal resources after the CoE period should not be required.*

The ToR ask for advice on whether strategies for preserving values after the CoE period should be considered when selecting centres. For the CoE to have lasting effects it is important that there are plans and a willingness to prolong activities in the research field. However, it is hardly reasonable to demand commitment concerning resource allocations decades after the submission of the applications. The interviewed host representatives emphasise that they expect centres to be capable of continued research activities without special support after a ten-year CoE period. They expect them to be competitive both in external and internal competition for funds. The dynamics of research and the need for institutional flexibility and autonomy are among those arguments used against long-term host commitment. It can also be argued that the host institutions can be expected to take a clear interest in maintaining the values created in CoEs (after ten years of investment in building strong research groups), and that commitments in the applications should be unnecessary (see also Recommendation 6).

Moreover, there are ways to consider expected activities without demanding defined host commitments after the CoE period. The review panels can assess the expected future importance of the research topics and perspectives proposed (from an international viewpoint), and also emphasise evidence that these are considered long-term research priorities firmly founded at the host institution. Such evidence may be the strength, scope and plans of the involved research groups, as well as the institution's research priorities.

Overall organisation and CoE terms

3) *The financial terms of the scheme, as well as the scope for local adaptation, should be clearly communicated.*

The host institutions have experienced challenges in financing the CoEs. Informants describe institutional co-payments, covering overhead costs and flat budgets (not adjusted for inflation) as problematic. However, the problems seem more related to the (different) interpretations of the financial terms of the scheme than to the terms themselves. There is a need for improved guidance and communication on the local adaptability of the terms and how to avoid the situation whereby institutional co-payments imply negative effects for other research groups. The calls for proposals should state clearly that the size of the institutional co-payments does not affect the selection of CoEs, that the lump sum CoE funding provided by RCN, as well as other external funding, may be used to cover (part of) the overhead costs, and that the financial plans for the CoE must take into account the flat rate of the CoE funding as well as the opportunity for transferring funding between years. New budgeting systems

at the higher education institutions ("*totalbudsjettering*") may be also prove helpful in managing co-payments and overhead costs.

The ToR refer to alternative funding terms that may limit the CoEs' financial impacts on the surroundings; full cost RCN funding of the CoEs, restrictions on the CoEs' possibilities to obtain other RCN funding, or restriction on the size of the CoEs. In the discussion with the informants, none of these alternatives was welcomed. The scheme is highly appreciated because of its flexibility and adaptability to different needs in diverse research fields and environments. All the mentioned alternatives would imply some restriction on the size and dynamics of CoEs, more standardised CoEs, and less adaptability to the dynamics of science.

Moreover, the major financial challenges for the surrounding research environments are perceived to be the general terms for Norwegian research, not the CoEs. The informants emphasised that the terms for the CoEs should not be constrained, but pointed to the need for better terms for independent basic research in general. To avoid a potential negative impact on other research, the budgetary authorities should consider improving other funding schemes for independent basic research. However, as stated above, more clarity concerning the local adaptability of the CoE terms and a concern to prevent negative effects of institutional co-payments will probably have positive outcomes in the local research environment.

4) *Each CoE should have defined ambitions for integrating activities and synergies with the local research environment and infrastructures. The CoE should be organised (board membership, leadership structure etc.) to facilitate these ambitions.*
There is great variety in the size, research fields and aims, research environments and organisational structures of the CoEs. Most involve several academic disciplines, but their scope varies considerably – from narrowly-focused research fields at the international research frontier (and few Norwegian peers outside the CoE), to broader fields with relevance to most of the host departments. Some of the centres are confined to one institution; others involve partners at several institutions. Given the heterogeneity of the centres, their needs concerning organisational structures differ. Consequently, the scheme should be flexible (as is the case) concerning issues such as formal organisation, board membership, local integration and demands for co-location. The most important measure for improving the organisation and management of the individual CoE would be to clarify the ambitions concerning integration in the local research environments and better adapt the organisation to these ambitions. When establishing new CoEs, valuable guidance can be drawn from the local experiences with existing CoEs and through exchanging experiences in the "SFF forum" and similar arenas. Overall, two key considerations are important when organising the CoEs: first to ensure the necessary autonomy of the centre, and second to avoid strained relationships within the local research environment. A proper combination of

these concerns should provide good synergies between the centre and the local research environment.

5) *The CoEs should participate in national initiatives and take a responsibility for enhancing their research fields nationally. The prime priority still needs to be excellence and collaboration with internationally leading research groups.*
The ToR ask for advice on what role the CoEs should play at the national level. The main aims of the CoE scheme are to promote scientific quality and strengthen internationalisation of Norwegian research as well as to promote researcher recruitment. Given the heterogeneity of the centres, their national roles differ. For example, some are part of larger research fields in Norway and have a major national role in educating PhD and master students in these fields. Others have most of their peers abroad and/or attract most of their PhD students from abroad. Regardless of this, they all play a national role in enhancing their field, strengthening the internationalisation of Norwegian research, and have a major role in recruiting and educating researchers. Some of the CoEs are large national consortia and the data also indicate that collaboration with Norwegian groups outside the CoEs has increased. In sum, the national roles of the centres seem adequate. As far as the RCN desires more emphasis on the national role of the centres, asking the CoE applicants to specify plans and priorities for their national role may be valuable. The data also point to the midterm evaluation as a good opportunity for communicating RCN's desires concerning national role including recruitment, gender balance and domestic scientific activity such as seminars and workshops. Although a few informants were doubtful that the midterm evaluation had any impact, there were many examples of CoEs making adjustments after this exercise.

The post-CoE period: maintaining competence and excellence

6) *The maintenance and advancement of competence and excellence in the post-CoE period will rely on the initiatives and success of the involved research groups, and the general financial terms for independent fundamental research. Centres well-integrated into their local research environment will have a better chance of preserving values in the post-CoE period. The host institutions need to assist the centres in planning their future organisation and local integration, and in applying for external funds.*
The ToR ask whether the host institutions have satisfying strategies for how to take care of the values created in the CoEs after the CoE period has ended. There are variations in the local leadership's attitudes to the CoEs. There are also differences in plans for facilitating post-CoE activities. More generally, it can be claimed that the CoEs themselves (in particular the first generation) are very active in applying for projects and funds for the post-CoE period and have aims and plans for how to continue the research when the CoE funding ends. The host faculties/ institutions, on the other hand, have tight budgets and are thus reluctant to make financial commitments for this period. But they are very concerned about taking care of the created values, and about taking a role in facilitating this. As explained in

Recommendation 2 above, they expect that the centres will be successful in competitions for external as well as internal research funds. The possibilities for preserving competence seem good, in particular for the centres which have been well integrated into their local research environment, and for those who already have a high proportion of external research funds. The general financial terms for independent fundamental research will, of course, be important, and informants call for increased funding for independent basic research projects to ensure the post-CoE period. It should nevertheless be added that the most important outputs of the centres – trained scientists and published science – may of course constitute the foundation for later research regardless of the fate of the actual CoE and its specific work programme.

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Appendix 1 Overview of the 21 present Norwegian CoEs

(copied from the RCN web page)

Chemistry

- Centre of Theoretical and Computational Chemistry (CTCC) is hosted by the University of Tromsø in cooperation with the University of Oslo. The CTCC's research activities cover transition metal chemistry, homogeneous and heterogeneous catalysis, bioinorganic chemistry, photochemistry, gas-phase chemistry and reaction dynamics.

Computer and Information Science and Engineering

- Centre for Biomedical Computing (CBC) is hosted by the Simula Research Laboratory and facilitates access to complex mathematical models for scientists. The primary application area is biomedicine, but the computational methodologies and software tools have relevance to many other areas of science and technology.
- Centre for Quantifiable Quality of Service in Communication Systems (Q2S) is hosted by the Norwegian University of Science and Technology. The Q2S derives mechanisms, methods and technical solutions related to the perceived quality, reliability and availability of service in communications systems.

Engineering

- Centre for Ships and Ocean Structures (CeSOS) is hosted by the Norwegian University of Science and Technology in collaboration with Marintek. The CeSOS aims to create a world-leading centre for developing fundamental knowledge for the design and operation of future ships and ocean structures.
- Centre for Integrated Petroleum Research (CIPR) is hosted by the University of Bergen. The CIPR is an international leading centre for developing fundamental knowledge aimed at maximizing recovery and increasing recoverable reserves in existing oil and gas fields.

Geosciences

- Bjerknes Centre for Climate Research (BCCR) is hosted by the University of Bergen in cooperation with the Institute of Marine Research and the Nansen Environmental and Remote Sensing Centre. The BCCR is a leading international centre for research on high-latitude climate change and a key provider of first-rate knowledge on climate change.
- International Centre for Geohazard (ICG) is hosted by the Norwegian Geotechnical Institute in cooperation with NORSAR, the Geological Survey of Norway, the University of Oslo and the Norwegian University of Science and Technology. The ICG carries out research on the assessment, prevention and mitigation of geohazards.

- Centre for Geobiology (CGB) is hosted by the University of Bergen. The CGB undertakes integrated interdisciplinary studies on the interaction between the geo-biosphere and the origins of life with a primary research focus on the deep seafloor, the deep biosphere and ancient crust formed in deep time.
- Physics of Geological Processes (PGP) is hosted by the University of Oslo. The PGP is a cross-disciplinary research centre, involving numerous physicists and Earth scientists on a mission to obtain a fundamental and quantitative understanding of the complex patterns and processes of the Earth.

Mathematical Sciences

- Centre of Mathematics for Applications (CMA) is hosted by the University of Oslo as a part of the Faculty of Mathematics and Natural Sciences and in collaboration with the departments of Informatics, Mathematics, Physics, the Institute of Theoretical Astrophysics, and SINTEF Applied Mathematics.

Life Sciences

- Aquaculture Protein Centre (APC) is hosted by the Norwegian University of Life Sciences in cooperation with the Norwegian School of Veterinary Science, and Nofima. The APC centres its research on improved utilisation of protein resources based on knowledge about the nutritional requirements of fish.
- Centre for Ecological and Evolutionary Synthesis (CEES) is hosted by the University of Oslo. The CEES combines competence from various fields of biology, molecular biology, bioinformatics and statistics to achieve an increased understanding of how living organisms respond and adapt to environmental changes.
- Centre for the Biology of Memory (CBM) is hosted by the Norwegian University of Science and Technology. The CBM aims to advance our understanding of neural circuits and systems. By focusing on spatial representation and memory, the investigators uncover general principles of neural network computation in the mammalian cortex.
- Centre for Molecular Biology and Neuroscience (CMBN) is hosted by the University of Oslo in cooperation with the Rikshospitalet University Hospital. The CMBN is at the forefront of elucidating the role of DNA repair and genome maintenance mechanisms in preventing neurological disease and brain ageing.
- Centre for Biomedical Computing (CBC) is hosted by the Simula Research Laboratory and facilitates access to complex mathematical models for scientists. The primary application area is biomedicine, but the computational methodologies and software tools have relevance to many other areas of science and technology.
- Centre for Immune Regulation (CIR) is hosted by the University of Oslo in cooperation with the Rikshospitalet University Hospital. The scientific goal of the centre is to identify mechanisms of immune dysregulation that contribute to autoimmune disease and allergy.
- Centre for Cancer Biomedicine (CCB) is hosted by the University of Oslo in cooperation with the Rikshospitalet University Hospital. The CCB aims to combine

large-scale and detailed biology research to increase the understanding of the complex dynamics of cancer evolution.

Social Sciences and Humanities

- Centre for the study of Equality, Social Organization, and Performance (ESOP) is hosted by the University of Oslo. ESOP aims at exploring the links between equality, social organization, and economic performance in rich and poor countries.
- Centre for Advanced Study in Theoretical Linguistics (CASTL) is hosted by the University of Tromsø and conducts comparative studies to explore the characteristic elements of linguistic variation, and to determine the parameters along which languages differ.
- Centre for the Study of Mind in Nature (CSMN) is hosted by the University of Oslo. The CSMN's core research topics lie at the interface of philosophy and the empirical sciences, such as linguistics, cognitive psychology, political science and economics.
- Centre for the Study of Civil War (CSCW) is hosted by the International Peace Research Institute (PRIO). The CSCW is a long-term, multidisciplinary initiative that seeks to understand why civil wars break out, how they are sustained, and what it takes to build a durable civil peace.
- Centre for Medieval Studies (CMS) is hosted by the University of Bergen and aims to enhance our understanding of Europe as a whole, in the Middle Ages, the period of European origin when the tension between unity and diversity came into being.

Appendix 2 Terms of reference for the evaluation

gh/- 22 September 2009
Research Council of Norway

Evaluation of the Norwegian Centres of Excellence scheme – Terms of reference

1 Evaluation framework

1.1 Introduction

The *Centres of Excellence (CoE)* scheme is designed to stimulate Norwegian research groups to set up centres devoted to long-term basic research of a high international calibre. The scheme is intended to raise the quality of Norwegian research. The goals for the CoE scheme are to:

- promote and award scientific quality in Norwegian research
- promote cutting edge basic research through long-term, generous funding
- strengthen internationalisation of Norwegian research
- create added value by establishing centres in host institutions
- build strong research groups
- promote researcher recruitment

The CoE scheme is administered by the Research Council of Norway and funded by the yield on the Fund for Research and Innovation. Each of the centres may receive funding for a maximum of ten (2x5) years. A mid term evaluation after 3 ½ years is conducted to assist the Council's decision on prolongation of financial support for the second five year period.

Selection of centres is based on an open competition. The scheme has had two calls for proposals. Thirteen centres started up in 2003. They were all prolonged to the full ten year period. Eight new centres started up in 2007.

1.2 Background for the evaluation

From a research policy perspective the Norwegian CoE scheme is so far considered very successful. The latest white paper on research has advocated a continuation of the scheme, with new centres starting up in 2013.

A mid term evaluation of the eight new centres will be carried out in 2010 according to plan. The RCN might also want to commission a scientific evaluation of the impact of the CoE scheme or a comparative evaluation involving different funding schemes. These types of evaluations would need a broader basis of experiences, however, and therefore will be suggested at a later stage.

The mid term evaluation of the first thirteen centres (2006) included some general observations on the CoE scheme. The conclusion was that it has had fundamental and beneficial effects on the research environment in Norway. A report from the Norwegian Academy of Sciences (2008) also concluded on the benefits of the CoE scheme, but disclosed some negative sides as well.

The Research Council has summarized its own experiences from the first two calls and find that the positive effects are unquestionable. However, some interesting but unintended effects have also been observed.

In order to gain additional information on how the scheme works and how it should be further developed, the Council has decided on an *evaluation of the CoE scheme* before launching the new call for proposals.

1.3 Purpose of the evaluation

The Research Council's interest is to seek answers to the following broad questions:

- What are the strong and weak points of the CoE scheme?
- What is the added value from CoEs for the R&D system in Norway?
- What challenges do CoEs represent for the R&D system in Norway?

Before launching another call for proposals, the RCN wants an evaluation that can give input to how these questions should be answered. Depending on these answers a revision of the requirements and guidelines set up for the CoE scheme may be necessary.

The questions stated above relate to the role of the CoEs, both in relation to the host institutions of CoEs, and as an important actor within its particular research field. This affects both managerial and strategic aspects and interactions with other activities within the institution. It also has consequences for other actors in their respective research fields on a national level.

Another important line of questions that should be pursued is directed towards the financing of the CoEs. This relates to the size of the individual CoEs and to the relative budgetary contributions from different sources.

The white paper on research has already announced the continuation of the CoE scheme. The calls should be on a five year cycle, and the centres should be selected through open calls to support the highest quality research. Furthermore, it has been stated that the financial support from the Research Council should be for a maximum of two five year periods, with a built-in midway evaluation, and they should be well integrated in their host institutions.

The evaluation must focus on the most important aspects of the CoE scheme where the input can contribute to changes of the existing format of the scheme – or confirm that the framework condition and selection processes so far should be reproduced. Due to time constraints and the fact that there is still limited experience with the scheme , the RCN wants to focus the evaluation towards two main focus areas: *financial aspects* and the *scheme's added value.* The more detailed questions that the Research Council would like investigated, are presented in section 2.2 and 2.3 under the mandate for the evaluation assignment.

1.4 Organization and basis for the evaluation assignment

The evaluation assignment is set up as a call for tenders for a partial evaluation of the Norwegian CoE scheme. A steering committee should be set up in consultation with the Research Council. The Research Council will supply background material on the funding scheme and procedures as well as information on funding data and other statistical data from the annual reports of the centres. Additional information must be collected through questionnaires and/or interviews/hearings.

The findings of the evaluation should be presented in a written report to the Research Council that should be made available no later than 15 August 2010.

2 Mandate for the evaluation assignment

2.1. Delimitation of the evaluation assignment

The partial evaluation of the Norwegian CoE funding scheme should primarily focus on two areas:

- Financial aspects
- Aspects of added value (other than scientific results)

2.2 Financial aspects

The evaluation should address the following issues:

- Is there a better way to finance CoEs in Norway?
    - - regarding total budget level for the individual CoEs
    - - regarding size of the research group (number of researchers)
    - - regarding the balance between the RCN grant and the host institutions own contribution (both in kind contributions and other internal financial support)
    - Should the RCN grant cover all cost of establishing and running the CoEs?
    - Should there be restrictions on other RCN funding for the CoEs?
    - Do the resource allocations to the CoE have negative implications for other research development?

2.3 Aspects of added value of the CoEs

There are certain expectations as to the scheme's added value for the nation, for the institutions, as well as for the research groups involved. The evaluation should address the following questions:

- How are the CoEs different from other ordinary research groups?

- What is the significance of the CoE-status?

- How are the centres perceived by their host institutions?
    - Does this vary with the type of host institutions involved?

- How could the organization of the CoEs be improved?
    - - within the host institutions
    - - regarding the internal management and steering structure

- What are the interactions between the CoEs, their host institutions and partners?
    - Is there potential for making improvements in the host institutions' way of organizing and handling their CoEs?
    - Have the CoEs made any strategic impact on the host institutions with respect to their research policy or research organization?
    - Have the CoEs had impact on scientific leadership and leadership recruitment?
    - Has the organization of CoE research had any impact on gender equality?

- What are the interactions between the CoE and other leading research groups in their respective fields nationally?
- What are the interactions between the CoE and other leading research groups in their respective fields internationally?

- Which role should the CoEs play on a national level?
    - - regarding graduate (PhD) schools

    - o - regarding other research groups within their field of research
    - o - regarding visibility of Norwegian research
    - o - regarding participation in EU programs

- Does it matter for the added value whether or not the host institution is a university or an independent research institute?
- Does it matter for the added value whether the CoE is situated in one location or is based on collaboration between groups that are not located in the same place?

- Do the host institutions have satisfying strategies for how to take care of the values created in the CoEs after the CoE-period has ended?
    - o Should such strategies be a part of the selection process?

- Is it likely that the CoEs have created lasting effects inside and/or outside their host institutions?

- Are there other findings from the evaluation that could contribute to the improvement of the CoE scheme?

2.3 Background material for the evaluation assignment

The following documents will be made available to the evaluator(s):

- "The Norwegian CoEs – Requirements and guidelines" (31 May 2005)
- "Midway Evaluation of the Norwegian CoEs", 10 November 2006
- Documents describing the application procedures and assessment processes
- Brief description of the RCN's different centre schemes
- Annual reports from the RCN (sections reporting on the CoEs)
- The RCN's input to the Government's White paper on research, February 2009
- "In the Vanguard of Research" – Strategy for the RCN 2009-2012

In addition the evaluation should include the following written documents:

- Self assessments from the 21 established CoEs
- Self assessments from the host institutions

Relevant interview objects or participants in hearings could be:

- Representatives from the CoEs
    - o Management
    - o Research fellows
    - o Members of the boards
    - o partners
- Representatives from host institutions (Top level/Faculty/Institute in leading positions)
- Representatives from other research environments (competitors/peers)
- Individuals involved in the selection processes
    - o CoE Scientific Committee
    - o International Evaluation Committee
    - o Members from different boards in the RCN
    - o Members of the RCN administration

Appendix 3 Overview of data sources

18 individual interviews and 14 group interviews (18 plus 58 persons)

- Representatives from the CoEs
  - CoE directors (10 individual interviews)
  - Research fellows (group interview encompassing PhD students from three CoEs)
  - Members of the boards (about 10 board members participated in group interviews at the host institutions)
  - Partners (about 10 partners participated in group interviews at the host institutions)
- Representatives from the 8 host institutions: 12 group interviews including at total of 52 persons (deans and departmental heads (or other representatives from the relevant departments), some central leadership (rector/director) and some administrative staff), as well as one individual interview.
- Representatives from other research environments (interviews with 5 non-successful finalists in the 2006 competition)
- RCN and its review panels
  - CoE Scientific Committee (individual interview with chair)
  - International Midway Evaluation Committee (individual interview with chair)
  - RCN administration and RCN board representatives (group interview with three persons)

38 questionnaire respondents

- Replies from 20 of the 21 CoE directors (one CoE director did not find time to reply even after two months following repeated reminders).
- Replies from 18 CoE competitors (all non-successful finalists in the 2006 competition)

Existing data sources

- Available R&D statistics: The national R&D statistics and the Register of Research Personnel are based on regular reports from the institutions to NIFU STEP. Data on funding trends for the relevant research areas, their funding sources, and gender balance have been used for comparisons.
- Previous analysis of Norwegian CoEs' success rates in the EU 7th Framework programme (Godø et al. 2009).
- ATEKST/Retriever: Have been used for basic comparisons of the media visibility trends of successful and unsuccessful CoE applicants (before and after the CoE competition).
- Documents and background information from RCN:
  - "Midway Evaluation of the Norwegian CoEs", 10 November 2006. The midway evaluation of the 13 first CoEs, including self-assessments prepared by the CoEs and their host institutions.
  - Annual reports from the RCN (sections reporting on the CoEs).
  - Key figures for the CoEs 2007, 2008 and 2009 (Excel files from RCN).
  - Background information: "The Norwegian CoEs – Requirements and guidelines" (31 May 2005); Brief description of the RCN's different centre schemes; Documents describing the application procedures and assessment processes; The RCN's input to the Government's White paper on research, February 2009; "In the Vanguard of Research" – Strategy for the RCN 2009-2012; "*Besøksrunde til de 13 eldste SFFene", Norges forskningsråd, Internt notat* 4.9.2009.

Appendix 4 Questionnaires

1) Questionnaire to CoEs established 2003
2) Questionnaire to CoEs established 2007
3) Questionnaire to finalists not obtaining CoE-status

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Evaluation of the Norwegian Centre of Excellence (SFF) scheme: Financial aspects and added value

Questionnaire to the SFFs (SFFs established 2003)

Please fill in the questionnaire and return to liv.langfeldt@nifustep.no before **8 March 2010**.

The boxes for the free text answers and comments have no size limit and will expand according to the text that you enter. When answering questions with fixed reply categories, please mark your choice with an 'x'.

Name of SFF	
Host institution	

1. Below, please indicate type, location and interdisciplinarity of the SFF.

Type of SFF

No formal institutional partner outside host institution	
Consortium/multiple partner institutions	

Location of the SFF

Located in one building	
Located in multiple buildings at one institution	
Located at multiple institutions	

If the type and location categories above are unclear or do not cover the conditions of the SFF, please explain below.

Degree of interdisciplinarity of the SFF

Low	
Medium	
High	

Please elaborate on the kind of interdisciplinarity of the SFF and indicate which disciplines are involved.

2. How is the situation of the present SFF compared to the situation for the key participants/your research group at time of the application (2002-2003)?

SFF situation concerning:	About the same	Increased	Decreased
a. research resources (funding, infrastructures and equipment)			
b. ability to attract external research funding (apart from SFF-funding)			
c. ability to attract young talented researchers			
d. ability to attract distinguished senior researchers			
e. participation in EU projects and other internationally funded projects			
f. collaboration with internationally leading research groups in your field			
g. role in making Norwegian research in your field internationally visible			
h. collaboration with industry or other research users			
i. collaboration with other* research groups/researchers at your department/institute			
j. collaboration with other* Norwegian research groups/researchers in your field			
k. interdisciplinary collaboration			
l. involvement in teaching at undergraduate/bachelor and master level			
m. involvement in PhD education			
	The same	Some-what different	Very different
n. key research topics			

*Other = researchers not participating in the SFF

Where changes, please indicate any specific conditions for the changes:
a. (resources)
b. (external funding)
c. (young talents)
d. (distinguished seniors)
e. (international projects)
f. (collaboration internationally leading)
g. (international visibility)
h. (industry/user collaboration)
i. (department collaboration)
j. (national collaboration)
k. (interdisciplinary collaboration)
l. (teaching)
m. (PhD education)
n. (research topics)

3. What do you consider to be the most important added value of the SFF *funding* for your research, and what is the most important added value of the SFF *status*?

Added value of funding:
Added value of SFF status:

4. The governance of the SFF [These questions are taken from the self-evaluation forms you filled in for the mid-term evaluation of the SFF. You only need to indicate changes and experiences after the self-evaluation (after 2005)]

Is the centre governed by a governing body of the host institution or by a specially appointed centre board?	
Specify who appoints the governing body, the representation of the governing body and the authority of the governing body and centre director, respectively	
Does the centre have a scientific advisory board? If yes, specify its members and the authority given to the advisory board	
Comments and views/assessments on the governance of the SFF: (1) role and authority of the governing board, (2) selection and appointment of board members, (3) relationship between governing board and centre director, (4) role of a scientific advisory board, if any, and (5) changes in governance planned due to experience acquired	

5. Organisation and administration of the SFF [These questions are taken from the self-evaluation forms you filled in for the mid-term evaluation of the SFF. You only need to indicate changes and experiences after the self-evaluation (after 2005)]

Specify how the centre is directed (by centre director alone or by centre director and a management group) and possible delegation of authority	
Specify how administrative matters related to management of centre personnel and economics are organised	
Comments and views/assessments on the organisation and administration of the SFF: (1) organisational structure chosen for the centre and effect of organisational structure on research quality and efficiency, (2) role of centre director both as a scientist and administrative head, (3) centre organisation as a means of promoting research quality and efficiency, (4) possible advantages and disadvantages associated with localised versus virtual centres of excellence, (5) research environment within the centre and possible organisational changes planned due to experience acquired.	

6. Please comment on the staff and recruitment situation of the SFF [This question is taken from the self-evaluation forms you filled in for the mid-term evaluation of the SFF. You only need to indicate changes and experiences after the self-evaluation (after 2005)]

It should specifically be pointed out (1) if the recruitment of staff is considered to be successful, (2) to what extent the centre has succeeded in addressing the gender perspective and attracting foreigners as staff members, and (3) if the size and expertise of the staff have allowed the scientific ambitions of the centre to be fulfilled. Finally, (4) the researcher training should be assessed with respect to scope, quality and gender perspective, reference being made to the original plans set for training doctoral candidates and providing postdoctoral specialisation.

7. Collaboration with host institution

Please comment on the centre's relation to its host institution: (1) The level of interaction between scientific staff at the centres and the host institution/host department, (2) how the centre influence/may influence the research environment in the host institution, as well as (3) interaction concerning administrative functions. Please elaborate on possible challenging issues and tensions in the cooperation with the host institution, as well as the centre's added value for the host institution.

8. If you have seen indications on any *negative effects* of the SFF scheme for Norwegian research, please elaborate below.

9. If your SFF have met any problems or serious limitations regarding the Norwegian SFF scheme, please elaborate below.

10. To what extent was the midterm evaluation of the centre (in 2006) helpful? Please elaborate on any impact of the midterm evaluation on the SFF (e.g. on its activities, research strategy/profile, organisation, or on the attitude or attention of the host institution).

11. If you have suggestions for improvements in the SFF scheme, please elaborate below (e.g. concerning (co)funding, size and organisation, host institution role, the national role of SFFs).

12. Other comments/experiences

If you have other views or experiences relevant for an evaluation of the financial aspects and added value of the SFF-scheme, please elaborate below.

Thank you for taking the time to fill in the questionnaire!

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Evaluation of the Norwegian Centre of Excellence (SFF) scheme: Financial aspects and added value

Questionnaire to the SFFs (SFFs established 2007)

Please fill in the questionnaire and return to liv.langfeldt@nifustep.no before **8 March 2010**.

The boxes for the free text answers and comments have no size limit and will expand according to the text that you enter. When answering questions with fixed reply categories, please mark your choice with an 'x'.

Name of SFF	
Host institution	

1. Below, please indicate type, location and interdisciplinarity of the SFF.

Type of SFF

No formal institutional partner outside host institution	
Consortium/multiple partner institutions	

Location of the SFF

Located in one building	
Located in multiple buildings at one institution	
Located at multiple institutions	

If the type and location categories above are unclear or do not cover the conditions of the SFF, please explain below.

Degree of interdisciplinarity of the SFF

Low	
Medium	
High	

Please elaborate on the kind of interdisciplinarity of the SFF and indicate which disciplines are involved.

2. How is the situation of the present SFF compared to the situation for the key participants/your research group at time of the application (2005-2006)?

SFF situation concerning:	About the same	Increased	Decreased
a. research resources (funding, infrastructures and equipment)			
b. ability to attract external research funding (apart from SFF-funding)			
c. ability to attract young talented researchers			
d. ability to attract distinguished senior researchers			
e. participation in EU projects and other internationally funded projects			
f. collaboration with internationally leading research groups in your field			
g. role in making Norwegian research in your field internationally visible			
h. collaboration with industry or other research users			
i. collaboration with other* research groups/researchers at your department/institute			
j. collaboration with other* Norwegian research groups/researchers in your field			
k. interdisciplinary collaboration			
l. involvement in teaching at undergraduate/bachelor and master level			
m. involvement in PhD education			
	The same	Some-what different	Very different
n. key research topics			

*Other = researchers not participating in the SFF

Where changes, please indicate any specific conditions for the changes:

a. (resources)
b. (external funding)
c. (young talents)
d. (distinguished seniors)
e. (international projects)
f. (collaboration internationally leading)
g. (international visibility)
h. (industry/user collaboration)
i. (department collaboration)
j. (national collaboration)
k. (interdisciplinary collaboration)
l. (teaching)
m. (PhD education)
n. (research topics)

3. What do you consider to be the most important added value of the SFF *funding* for your research, and what is the most important added value of the SFF *status*?

Added value of funding:

Added value of SFF status:

4. The governance of the SFF [These questions are taken from the self-evaluation forms of the for the mid-term evaluation of the first SFFs in 2006]

Is the centre governed by a governing body of the host institution or by a specially appointed centre board?	
Specify who appoints the governing body, the representation of the governing body and the authority of the governing body and centre director, respectively	
Does the centre have a scientific advisory board? If yes, specify its members and the authority given to the advisory board	
Comments and views/assessments on the governance of the SFF: (1) role and authority of the governing board, (2) selection and appointment of board members, (3) relationship between governing board and centre director, (4) role of a scientific advisory board, if any, and (5) changes in governance planned due to experience acquired	

5. Organisation and administration of the SFF [These questions are taken from the self-evaluation forms of the for the mid-term evaluation of the first SFFs in 2006]

Specify how the centre is directed (by centre director alone or by centre director and a management group) and possible delegation of authority	
Specify how administrative matters related to management of centre personnel and economics are organised	
Comments and views/assessments on the organisation and administration of the SFF: (1) organisational structure chosen for the centre and effect of organisational structure on research quality and efficiency, (2) role of centre director both as a scientist and administrative head, (3) centre organisation as a means of promoting research quality and efficiency, (4) possible advantages and disadvantages associated with localised versus virtual centres of excellence, (5) research environment within the centre and possible organisational changes planned due to experience acquired.	

6. Please comment on the staff and recruitment situation of the SFF [These questions are taken from the self-evaluation forms of the for the mid-term evaluation of the first SFFs in 2006]

It should specifically be pointed out (1) if the recruitment of staff is considered to be successful, (2) to what extent the centre has succeeded in addressing the gender perspective and attracting foreigners as staff members, and (3) if the size and expertise of the staff have allowed the scientific ambitions of the centre to be fulfilled. Finally, (4) the researcher training should be assessed with respect to scope, quality and gender perspective, reference being made to the original plans set for training doctoral candidates and providing postdoctoral specialisation.

7. Collaboration with host institution

Please comment on the centre's relation to its host institution: (1) The level of interaction between scientific staff at the centres and the host institution/host department, (2) how the centre influence/may influence the research environment in the host institution, as well as (3) interaction concerning administrative functions. Please elaborate on possible challenging issues and tensions in the cooperation with the host institution, as well as the centre's added value for the host institution.

8. If you have seen indications on any *negative effects* of the SFF scheme for Norwegian research, please elaborate below.

9. If your SFF have met any problems or serious limitations regarding the Norwegian SFF scheme, please elaborate below.

10. If you have suggestions for improvements in the SFF scheme, please elaborate below (e.g. concerning (co)funding, size and organisation, host institution role, the national role of SFFs).

11. Other comments/experiences

If you have other views or experiences relevant for an evaluation of the financial aspects and added value of the SFF-scheme, please elaborate below.

Thank you for taking the time to fill in the questionnaire!

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Evaluation of the Norwegian Centre of Excellence (SFF) scheme: Financial aspects and added value

Questionnaire to finalists not obtaining SFF-status

Please fill in the questionnaire and return to liv.langfeldt@nifustep.no before **8 March 2010**.

The boxes for the free text answers and comments have no size limit and will expand according to the text that you enter. When answering questions with fixed reply categories, please mark your choice with an 'x'.

SFF-application/name of planned centre	
Host institution	

1. Below, please indicate the kind of group applying for the SFF, the outcome/today's situation for the group, as well as the interdisciplinarity of the SFF you applied for.

Planned participants/research group(s)

Group(s)/ consortium existing before the application	
Group(s)/consortium composed specifically for this SFF application	
Group(s)/ consortium still existing today	

Other funding obtained for the activities suggested in the SFF application

No funding obtained	
Funding from own institution obtained (amount NOK):	
External funding obtained from (sources):	
Amount of external funding obtained (NOK):	

Outcome concerning the activities suggested in the SFF application

None of it is carried out	
Parts of it is carried out	
Most of it is carried out	

Below, please elaborate on the outcome concerning the activities planned in the SFF applications and today's collaborations between the researchers/groups applying for the SFF.

Degree of interdisciplinarity of the SFF

Low	
Medium	
High	

Please elaborate on the kind of interdisciplinarity of the SFF and indicate which disciplines are involved.

2. Please indicate the present financial situation for your research group/your research compared to the financial situation at time of the application (2005-2006).

Today's situation concerning:	About the same	Increased	Decreased
a. Basic funds/funds from the university/faculty			
b. Funds from the Research Council of Norway			
c. Other external funding			

Please elaborate differences in financial situation and possible explanations below.

3. Please indicate the present network and collaboration of your research group/your research compared to the situation at time of the application (2005-2006).

Today's situation concerning:	About the same	Increased	Decreased
a. participation in EU projects and other internationally funded projects			
b. collaboration with internationally leading research groups in your field			
c. role in making Norwegian research in your field internationally visible			
d. collaboration with industry or other research users			
e. collaboration with other* research groups/researchers at your department/institute			
f. collaboration with other* Norwegian research groups/researchers in your field			
g. interdisciplinary collaboration			

*Other = researchers not participating in the planned SFF

Please elaborate differences in network/collaboration and possible explanations below.

4. Please indicate the present recruitment and teaching situation for your research group/your research compared to the financial situation at time of the application (2005-2006).

Today's situation concerning:	About the same	Increased	Decreased
a. ability to attract young talented researchers			
b. ability to attract distinguished senior researchers			
c. involvement in teaching at undergraduate/bachelor and master level			
d. involvement in PhD education			

Please elaborate differences and possible explanations below:

5. In your opinion, has the establishment of Norwegian Centers of Excellence (the SFF-scheme) influenced the funding of <u>your research field</u>?

Yes ☐
No ☐

Please elaborate (why influence/why no influence):

6. In your opinion, has the establishment of Norwegian Centers of Excellence (the SFF-scheme) influenced the funding of <u>your group</u>?

Yes ☐
No ☐

Please elaborate (e.g. positive impact of the SFF-application process/being among the finalists, negative impact of host institution and/or RCN allocating more resources to other groups/research field):

7. Other comments/experiences

If you have other views or experiences relevant for an evaluation of the financial aspects and added value of the SFF-scheme, please elaborate below:

Thank you for taking the time to fill in the questionnaire!

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