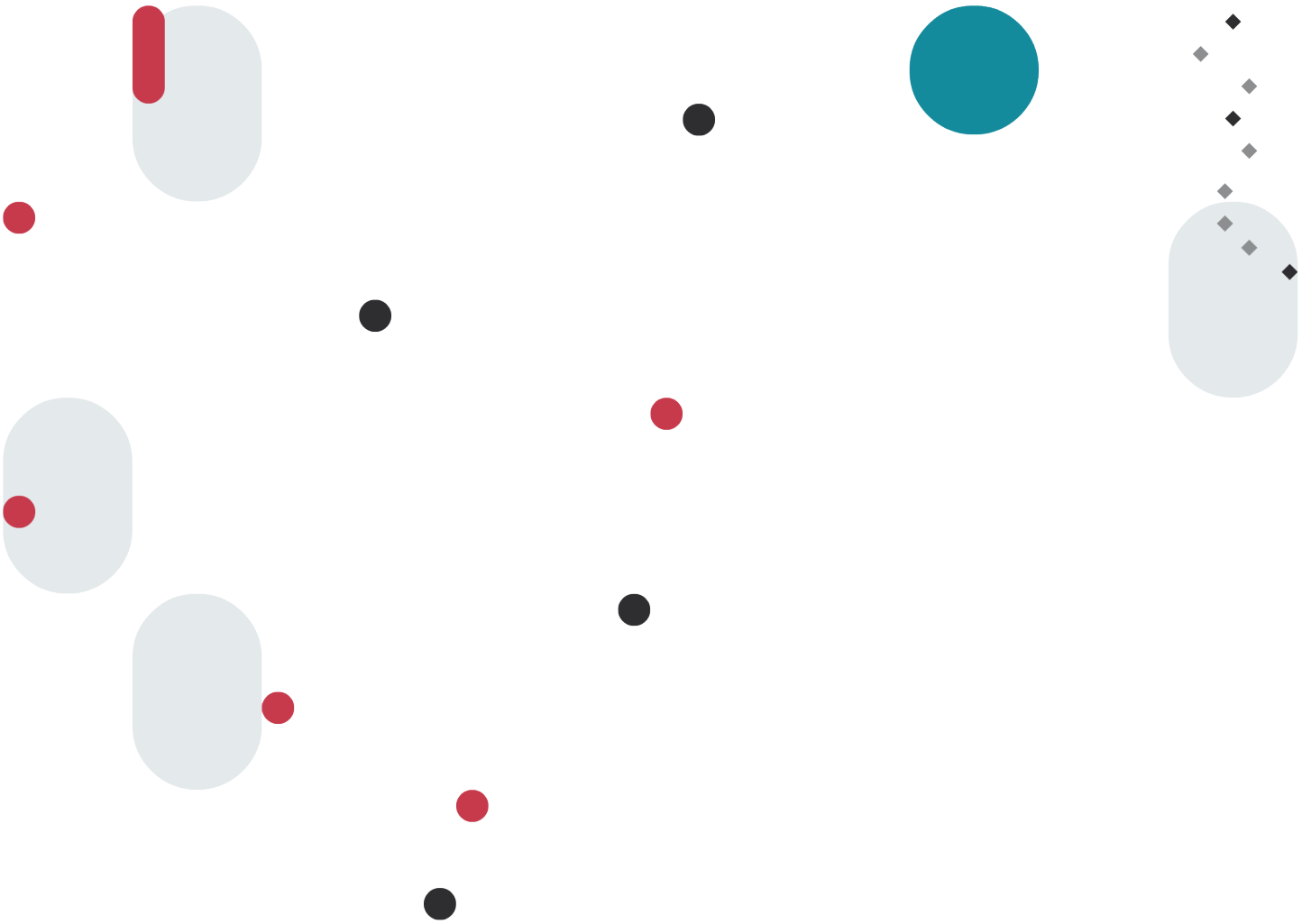

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Report 8/2012

NIFU

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# Preface

This evaluation of the Norwegian scheme for independent research projects (FRIPRO) was commissioned by the Research Council of Norway (RCN). It was performed by NIFU with assistance from the Danish Centre for Studies in Research and Research Policy (CFA). The Terms of Reference for the evaluation are found in Appendix1.

The members of the evaluation team were Liv Langfeldt (project leader, NIFU), Inge Ramberg (NIFU), Gunnar Sivertsen (NIFU), Carter Bloch (CFA) and Dorothy S. Olsen (NIFU).

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 FRIPRO applicants, representatives of the research institutions, RCN and the FRIPRO expert committees.

Oslo, March 2012

Sveinung Skule
Director

Olav R. Spilling
Head of Research

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# Executive summary

FRIPRO is a funding scheme for independent research projects encompassing basic research in all areas. It is a key instrument of the Research Council of Norway (RCN) for fostering basic research and promoting high scientific quality through open national competition for funds. Moreover, the scheme aims to promote the development of basic theory and methods, scientific renewal and research recruitment. This evaluation was initiated by the RCN to assess the degree to which the scheme achieves these objectives. It is based on comparisons of the outcomes of funded and rejected FRIPRO projects (via survey replies and bibliometric data), analyses of the application portfolio, interviews with key stakeholders and data available in national R&D statistics. We also compare the findings with data from previous studies on the outcome of research funding schemes.

The evaluation encompasses the period 2005 to 2010. In this period the FRIPRO scheme received 6 064 applications and allocated a total of NOK 2.8 billion to Norwegian research institutions. The key findings are summarised below.

### Quality, scientific development and renewal

According to survey responses, the profile of funded FRIPRO projects is in accordance with the objectives of the scheme. A substantial share of applicants report that their FRIPRO projects are more oriented towards basic research, have higher scientific quality and provide more new scientific results, than their other projects. Moreover, the funded applicants more often characterise their FRIPRO project as being more scientifically risky and internationally orientated than their other projects.

Bibliometric data shows that FRIPRO supports the researchers with the best track record: those who obtain FRIPRO funding have a higher publication rate than those who are rejected (only publications of the principal investigator (PI) for each application are examined). Younger successful applicants stand out especially clearly, with a higher citation impact than the other groups. Both successful and unsuccessful applicants are more cited than the world average – the successful somewhat more so than the unsuccessful. The results show that there is only marginal change in the field-normalised relative citation rates for the period before (2001-2005) and after (2006-2009) funding decisions for both funded and rejected applicants. Clear changes may be observed on the subfield level only, and the direction of change varies. Consequently, the funding or rejection of FRIPRO applications does not seem to have a measurable effect on the citation or publication rates of the PIs. This observation is perhaps not unexpected, since the publications (and citations) of PIs in the natural and medical sciences, which dominate in our bibliometric data, will typically cover several projects and funding sources within smaller or larger networks of national and international scientific collaboration. Consequently, untraceable changes in publication and citation rates need not be interpreted as a sign of lacking importance or effect of the FRIPRO funding.

### Competence building and research recruitment

Informants emphasise that there is a need for more recruitment positions than those allocated directly to the universities, and the national competition for the FRIPRO recruitment positions is perceived as promoting high quality. FRIPRO has funded a moderate proportion of the overall number of doctoral degrees awarded in Norway in the period studied. These numbers are still large enough to be important for recruitment to research, especially in fields where there are few other funding options for research recruitment. The importance also seems to differ between the general research areas; FRIPRO funds more research recruitment positions in the natural sciences than in other areas, and also seem to account for a larger proportion of the total number of awarded doctoral degrees in the natural sciences.

A large share of the applicants report positive impacts on their research career. Of those below 40 years old, about 60 per cent of those funded by FRIPRO fully agree that the project has had positive impacts on their career. In addition, 40 per cent of unsuccessful applicants in this age group fully agree that the project had positive impacts on their career. Many unsuccessful FRIPRO applicants go on to obtain alternative funding, and in terms of numbers of PhDs, it seems that rejected FRIPRO applications have resulted in more PhDs than funded projects. This indicates that some research environments applying for FRIPRO projects have alternative funding sources for recruitment positions, and that the FRIPRO application and review process may increase the likelihood for obtaining other funding.

The moderate quotas applied by FRIPRO to help female researchers to qualify for senior positions seem to be effective. The proportion of applications from female researchers has increased during the 6-year period studied, and the success rate of female applicants has also increased (compared to the success rate of male applicants).

### Collaboration and international orientation

FRIPRO aims to enhance the international orientation of the research communities and plans for international research cooperation are part of the review criteria for applications. Bibliometric data show that successful FRIPRO applicants have a higher degree of international co-authorship than unsuccessful applicants. Moreover, our analysis of success rates indicates that ‘international cooperation’ is an effectively implemented review criterion.

On the other hand, data on FRIPRO’s effect on international research cooperation is inconclusive. The survey data indicate that FRIPRO funding has a considerable effect on international research cooperation, but this finding is not corroborated by data on international co-authorship. The FRIPRO funding does not have a measurable effect on the international co-authorship of successful applicants; while successful applicants have a higher degree of international co-authorship in general, their patterns of international co-authorship do not seem to be affected by the FRIPRO funding. However, the survey data shows a considerable difference between successful and unsuccessful applicants: those obtaining FRIPRO funds are much more likely to report that their long term international cooperation has been enhanced as a result of the project.

### Institutional strategies

The data shows a clear role for the FRIPRO scheme. As the only scheme allocating project grants for independent basic research, based on open calls and national competition, the scheme has a high standing in the Norwegian research community. Universities are the main target group for the scheme (receiving 86 per cent of the funding) and the scheme is also highly appreciated at the institutional level. Researchers are encouraged to apply for funds and information about calls is actively distributed at the universities. Informants consider there to be a need for much more research funding than is available at universities, and FRIPRO is an open, general scheme which suits the different needs of the different research environments. Moreover, obtaining a good review for an application to FRIPRO is perceived as providing a quality marker for researchers or projects, and several institutions have economic incentives for FRIPRO applicants and follow up highly rated, but not funded, projects.

Informants had diverse views on the balance between FRIPRO/independent project funding and general university funds. In general, the open national competition for funds was appreciated. Some trusted their departments' ability to compete for FRIPRO funds more than competing for university funds, or doubted the universities' abilities to distribute funds to the best projects. Others were more in favour of institutional funds, as they had concerns about the universities' room for manoeuver and priority setting, or were unsure about FRIPRO's ability to cater for small/non mainstream research environments.

FRIPRO seems to be regarded as an especially important scheme by those within the humanities, where there are few other external funding sources.

### Substantial effects on research, less on structures

The added value of the projects supported by FRIPRO was studied in relation to rejected projects implemented with other resources, with comparisons made along several dimensions (for applications in the years 2005 to 2007). While added value for research and for the researchers seems generally good, added value for the institution/department was, perhaps unsurprisingly, thought to be lower.

Concerning added value for the researchers, the potential for positive career development seems high for the successful FRIPRO applicants. Among successful applicants, 69 per cent report a positive career effect of the project, whereas only 47 per cent of those implementing projects with other resources reported such an effect. There is also a similar effect found in terms of the positive effect on applicants' research management skills (66 versus 49 per cent).

Concerning added value for research, 78 per cent of successful applicants report unexpected results of importance to the research field, whereas 61 per cent of those implementing the project with other resources report such an effect. Moreover, 79 per cent of successful applicants report that the project has explored new research areas of significant importance for their future research, whereas 57 per cent of those implemented with other resources report such an effect.

Concerning added value for research departments, the effects on the department's reputation seem considerable, but effects on the department's ability to prioritise research areas seem small. While 64 per cent of successful applicants report a positive impact on the department's reputation, only 48 per cent of those implementing the project with other resources report such an effect. On the other hand, 28 per cent of successful applicants and 20 per cent applicants who have implemented their projects with other resources report improved ability to prioritise research. Moreover, effects on group structure and how research is performed appear to be sleight.

### Interfaces with other funding schemes

The analysis of FRIPRO success rates suggests an elitist funding scheme. The success rate is generally low, and has decreased during the studied period (from 19 per cent for applications in 2005, to 11 per cent for applications in 2010). The large majority of applications come from universities, and the universities also have the highest success rate.

A large proportion of applicants consider FRIPRO funds as offering support for research for which there is no other RCN scheme, and FRIPRO is the most popular scheme for those resubmitting FRIPRO applications. However, many applicants find alternative funding sources for their FRIPRO projects, and a majority of rejected applications seem to be implemented. Moreover, FRIPRO funding seems to open doors for other funding: a substantial proportion of those obtaining FRIPRO grants report that the FRIPRO funding enabled them to successfully compete for funding from other external sources.

In the survey, applicants were asked to rate FRIPRO compared to other Norwegian and international funding sources. As expected, FRIPRO scores far better compared to other Norwegian sources than it does relative to international sources. When compared with other Norwegian funding sources, FRIPRO scores best on the opportunities offered for doing unique/original research and on the impact

on the prestige and career of the researchers. On the other hand, FRIPRO scores somewhat lower than Norwegian alternatives in terms of the opportunities offered for doing interdisciplinary research, the amount of funding, the support for young scientists and the support for new projects without requiring preliminary research. In comparison to international funding sources (including ERC grants, which were specified in the question), FRIPRO scores lower on all items, except the flexibility of use of funds.

### Organisation and review procedures

When asked to rate the FRIPRO review policies and processes, applicants give the highest score on the ability to support well-founded and solid research, and the lowest score on support for high-risk research (scoring an average of 3.7 versus 2.5 on a scale from 1 to 5). The funded FRIPRO applicants rate the competence of the review committees considerably higher (3.7 on average) than the non-funded applicants do (2.9 on average). This may indicate generally higher satisfaction among the funded applicants, or that applications that match the competencies in the review committee have a higher chance of being funded. In terms of the application processes, both funded and non-funded applicants are most satisfied with the access to relevant background information for the call, and least satisfied with the transparency of funding decisions. The overall cost efficiency of the application process is also rated poorly. Many applicants, including those who are successful, consider that too much time is spent on the application process.

Compared with similar data on the Human Frontier Science Program (HFSP), FRIPRO scores considerably lower on facilitating high-risk and interdisciplinary research. The HFSP is a prestigious, international scheme specially aimed at facilitating high-risk and interdisciplinary research, and achieving the same score as HFSP would be a highly ambitious aim. Both for support for high-risk research and facilitating interdisciplinarity, the successful FRIPRO applicants on average rate their scheme 1.1 lower (on the scale from 1 to 5) than the successful HPSP applicants do.

Informants involved in the review process consider the reorganisation of the review process that took place in later years to mark a substantial improvement. The introduction of the review panels imply that the expert reviewers meet and discuss each application. This is thought to enable more thorough assessments than individual reviews and, at the same time, the joint assessments from the experts facilitate the work of the FRIPRO committees which make the funding decisions. Ensuring adequate expertise in all panels and for all applications is still a central challenge. The applications are diverse, and larger and broader applications may be difficult to assess. Informants suggested various ways to better ensure competence in the panels, including more panel members, separate panels for multidisciplinary proposals and proposals that do not fit into disciplinary panels, and more frequent use of reviewers proposed by applicants. Monitoring of the quality of the panel review reports, and the possibility of asking the review panel for a revised report when the expert committee detects errors or shortages, was also discussed.

### Goal achievement

In summary, the FRIPRO scheme is found to achieve its central objectives concerning supporting basic research of high scientific quality and which is internationally orientated (ensured by selecting the applicants with the best track record). Moreover, FRIPRO appears to be having an important impact on research recruitment and to be good at providing opportunities for female researchers. Results are somewhat mixed concerning scientific renewal. Funded applicants more often characterise their FRIPRO projects as more scientifically risky and more multidisciplinary than their other projects, but in general the applicants do not rate FRIPRO highly on facilitating high-risk and interdisciplinary research.

### Recommendations

There is a tension between FRIPRO's role as the only national funding scheme for independent, basic research, open to all research fields, and its role as an elitist scheme for outstanding research, which funds only a small proportion of applications. It is hardly possible to cater for all research fields and to

identify new promising areas and groups, when the success rates are very low and a top rating and convincing track record are demanded for an application to succeed. Moreover, some applicants do not trust FRIPRO's ability to fund original research and promote scientific renewal. In Chapter 7 two overall challenges are set out as requiring further consideration, relating to the future of the FRIPRO scheme: (1) To what extent should scientific renewal be a major objective of the FRIPRO scheme?; and, (2) How can the applicants' confidence in the review process be increased?

If the RCN promotes scientific renewal as a major objective of the FRIPRO scheme, there should be some monitoring of how scientific renewal is emphasised in the review process, and the Research Council should be more active in selecting reviewers who are known to be concerned about high-risk research and scientific renewal, and good at identifying promising research projects according to such criteria. Moreover, the review guidelines should more explicitly ask the review panels, as well as the expert committees, to give more weight/higher priority to new and small promising research fields than to established research fields.

Concerning applicants' confidence in the review process, more information and better communication of the review terms and procedures seem to be needed. Key information that would help applicants to better understand the terms of the competition they are taking part in includes: the criteria for dividing the budget between research areas, general information on the priorities and concerns in the expert committees' final decisions, and more statistics on applications and success rates. More generally, the work of composing review panels and assigning applications between panel members, and ensuring the quality of review reports, is highly important both for a thorough and fair review process, and for applicants' confidence.

# 1 Introduction

## 1.1 FRIPRO – Background of the evaluation

With roots going back to the five former Norwegian research councils, funding for independent research projects has been a key instrument in Norwegian research policy for decades. Until the mid-1980s – and the introduction of thematic research programmes – the funding of all five former research councils was mainly based on open calls and independent researcher initiated projects (Langfeldt 1998, p 25). From 1993, the funding for independent research projects is organised by the Research Council of Norway (RCN) and over time merged to one funding scheme encompassing all research areas.

In the later years, the importance of increased funding for independent research has been much emphasised in Norwegian research policy debate. The debate expresses concerns about limited funding and high rejection rates within the RCN scheme for independent research projects. Increased funding for independent research projects has long been a concern both of RCN and of the Norwegian Academy of Science and Letters, and increased funding for independent research projects was one of the key recommendations in the recently submitted report from the Fagerberg Committee (NOU 2011:6 Et åpnere forskningssystem). In sum, a general opinion in the research community is that independent research projects have important characteristics not found in research funded within thematic research programmes. Still, there are few studies on the role and impact of funding schemes for independent research projects to document this.

The general understanding of the role of funding for independent research is reflected in the objectives of today's scheme for independent projects (FRIPRO) of the Research Council of Norway, and the emphasis on promoting scientific quality and open competition:

> *'The FRIPRO scheme fosters research of high scientific quality. The aim of the scheme is to fund the research projects that are best in scientific terms.'*
> *'The FRIPRO scheme comprises a competitive arena open to all research areas and disciplines. There are no thematic guidelines and no requirements relating to the applicability or immediate utility of the research.'*
> *'The FRIPRO scheme promotes the development of basic theory and methods as well as scientific renewal within disciplines.'*
>
> (from the FRIPRO presentation at www.forskningsradet.no)

The FRIPRO scheme is one of the Research Council's key funding instruments for fostering basic research. In addition to the objectives defined above – the promotion of research of outstanding

scientific quality through open national competition and the development of basic theory and methods and scientific renewal – the scheme is also designed to promote recruitment.

### The FRIPRO budget

During the period to be evaluated, the FRIPRO funding has been NOK 460 to 515 million per year (Table 1.1). This is about 8 per cent of the total RCN funding in the period, and substantially less than the allocation to the thematic research programmes.

**Table 1.1 RCN expenditures by funding schemes 2006 to 2011. NOK million.**

| Type of funding scheme | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Large-scale programmes (Store programmer) | 831.0 | 966.9 | 1039.7 | 1179.8 | 1317.9 |
| User-directed innovation programmes (Brukerstyrte innovasjonsprogram) | 830.2 | 842.2 | 929.3 | 1013.3 | 1089.0 |
| Basic funding to research institutes (Basisbevilgninger) | 684.0 | 703.1 | 718.4 | 820.3 | 853.2 |
| Policy-oriented programmes (Handlingsrettede programmer) | 613.4 | 635.0 | 714.1 | 769.3 | 820.9 |
| Centre schemes (SFF/SFI/FME) | 130.0 | 300.0 | 331.1 | 531.0 | 540.4 |
| ***FRIPRO (Fri prosjektstøtte)*** | ***481.9*** | ***500.7*** | ***515.5*** | ***460.8*** | ***480.4*** |
| International measures (Internasjonale tiltak) | 282.6 | 287.3 | 280.8 | 259.7 | 293.8 |
| Funding for scientific equipment, databases/collections (Vitensk. utstyr, datab, saml) | 54.2 | 64.7 | 46.4 | 194.7 | 271.4 |
| Basic research programmes (Grunnforskningsprogrammer) | 236.3 | 287.2 | 260.7 | 248.9 | 257.3 |
| Other schemes* | 1 190.7 | 1 068.8 | 923.4 | 996.6 | 1 039.7 |
| **Total** | **5 334.4** | **5 655.8** | **5 759.5** | **6 474.4** | **6 964.1** |

Source: Forskningsrådet i tall. Prosjekt, bevilgnings- og søknadsstatistikk 2006-2010 for Norges forskningsråd, Norges forskningsråd 2011, Table 2.

*Includes a number of different schemes: YFF, SHP, Industrial PhDs, FORNY, VRI and others.

The overall FRIPRO budget is set according to the amount assigned by the Ministry of Research and Education[1]. Since 2010, the FRIPRO budget has increased substantially. For 2011, NOK 521 million was allocated to FRIPRO, and in 2012 the amount was NOK 620 million. The increase of 100 million for 2012 from the Ministry was matched by 100 million from the universities ('Fellesløftet'), resulting in a total FRIPRO budget at 720 million. The 100 million extra from the universities is used for funding high scoring FRIPRO applications (obtaining 6 or 7 on the 1-7 rating scale) that do not obtain funding within the regular budget (each university funds their own applications). As mentioned above, both the universities and the RCN have long argued for the need for increased funds. In 2011 the universities promised to match a budget increase with a similar amount from their own budget, and the Government responded by increasing the budget by 100 million for 2012.

Still, in a longer perspective, independent researcher initiated projects, have gone from being a dominant funding instrument of the Norwegian research councils until the 1980s/90s, to accounting for a smaller proportion of the overall research council funding, and to being far more selective (high rejection rates). Today, budget documents describe FRIPRO as an instrument for 'outstanding research projects' ('konkurransearenaen for Fremragende forskerprosjekter'[2]), not simply as independent researcher projects or general responsive mode funding.

## 1.2 The evaluation task

### The Terms of Reference

The purpose of evaluation stated in the Terms of Reference is to 'acquire a more systematic overview on which to base the Research Council's efforts to further refine the FRIPRO scheme as an instrument

[1] FRIPRO has obtained funds also from other sources/Ministries, but the Ministry of Research and Education is the dominant sponsor. The RCN allocates the budget to the various research areas/review committees (fagkomiteer). Funds from other ministries than the Ministry of Research and Education may be earmarked specific research areas.

[2] 'Budsjettforslag 2012', Oslo 2011, RCN (www.forskningsradet.no/publikasjoner).

for promoting basic research of high scientific merit.' The evaluation should focus on the role and impact of the scheme in the period from 2005 to the present, and:

- 'assess the degree to which the FRIPRO scheme achieves its objectives, and how;
- assess the significance of funding for independent projects for research institutions;
- provide recommendations which the Research Council can integrate into the further development of the scheme.'

More specifically, 17 questions are listed in the ToR (Appendix 1), ranging from general questions about research quality, to questions about impact on strategic focus of the research communities, recruitment, gender quotas, interfaces with other funding schemes, and the selection of projects. The broad set of questions regarding the role, significance and impact of FRIPRO demand comprehensive data and analyses. The approaches applied are described in the next section.

## 1.3 Methods and data sources

In order to address the questions in the ToR for the evaluation, several comparative approaches are applied. We use data available in national R&D statistics, in the RCN project data base, as well as interviews with key stakeholders, and we compare the outcome of funded and rejected FRIPRO projects based on survey replies and bibliometric data. We also compare with data from previous studies on the outcome of research funding schemes. Below the various data sources are described.

### Documentary evidence and comparative data

The background material employed includes relevant RCN documents for the period 2005 to 2010 – annual overview reports on the FRIPRO application review process and outcomes, reports submitted to the Research Board of the Division for Science, budget documents and key figures on grant applications and allocation. Moreover, national statistics on funding sources for R&D and the Register on Research Personnel are used as a comparative basis.

NIFU has data from several evaluations of funding schemes that can be used to place the results from the FRIPRO evaluation in a broader perspective, including survey replies from evaluations of international programmes (EURYI and HFSP) and from surveys to Norwegian participants in the EU framework programme.

The Danish Centre for Studies in Research and Research Policy (CFA) has recently conducted two evaluations of funding measures within the Danish Council for Independent Research (Det Frie Forskningsråd, DFF). The first is an evaluation of funding of female researchers and young researchers over the period 2001-2008 (Danish Agency for Science, Technology and Innovation, 2010), where large share of funding concerned post doc fellowships. The second is an evaluation of funding for research projects for 2001-2008 (Danish Agency for Science, Technology and Innovation, 2011). Both evaluations are structured in a similar way to the present evaluation, providing a good basis for comparison.

### Portfolio analysis

The FRIPRO applicant and awardee profiles 2005 to 2010 are studied based on RCN's data bases. Success for the various research areas, sector/institutions, project size, age and gender are calculated. The RCN provided a data set comprising the needed details for the 6064 FRIPRO applications in the period.

### Survey to applicants

NIFU conducted a web-based survey of both funded and rejected FRIPRO applicants in the years 2005, 2006 and 2007. The years were selected to enable information on outcome of the projects, as well as being recent enough for the respondents to recall the project application and be able to reply

also for the possible follow-up of rejected applications. The initial plan was to include only applications from 2005 and 2006, but we found that with two years only and the low number of funded applications by year, we would not get a sufficiently large sample for analysing results split into research fields, sector, gender, etc.

Respondents were asked about their particular FRIPRO application (listed in the questionnaire), the application/review process, the added value of the project in terms of scientific and other results, additional funding, collaboration/networks and internationalisation, as well as more general questions about the FRIPRO scheme. Those who had applied for several FRIPRO projects in the 3-year-period were asked to account for each of the applications. The questionnaire is found in Appendix 4.

*Applicant survey response rates*

The FRIPRO survey was launched on 2 January 2012 for the principal investigators listed in the 2699 FRIPRO applications (the total population in the period 2005-2007)[3]. Hence, the 2699 invitations to participate were sent by email including a unique web-survey link to a total of 1873 different applicants. Some 800 applicants had two or more applications in the period and received one invitation per application. Some invitations were later forwarded to a collaborator on the application/project that could provide higher quality information.

A total of three *reminders* were issued for the respondents not answering on their two most recent applications. The data collection ended 9 February. A total of 1512 responses are included in our dataset. This gives an *adjusted response rate* of 64.3 per cent based on an adjusted population size of 2350 invitations (accounting for the email addresses that proved to be invalid).[4] We find the survey response rate to be satisfactory, and higher than could be expected taking the long questionnaire format with the many retrospective questions into consideration.

Table 1.2 shows answers to the survey-entering questions for the 1512 respondents. A total of 1379 applicants confirmed that they knew the application specified in the questionnaire and that the information was correct (Table 2.1, first three rows in first column). 929 of these had received questionnaire for one application only, whereas 244 replies are 'primary' replies from researchers with multiple applications in the period (full questionnaire), and 206 are secondary replies from researchers with multiple applications (application specific questions only). In total, 35 respondents reported that they did not know the application, whereas 64 respondents did not answer the question.

[3] The sample of 2699 applications includes all applications for research projects and individual fellowships in the period (except withdrawn, declined and other non-reviewed applications). Email addresses were obtained for all 2699, but 200 of these addresses proved to be invalid.

[4] If we exclude those applicants receiving three or more invitations for their respective applications in the time period in question, the adjusted response rate is 3.4 percentage points higher.

**Table 1.2 Respondents' replies to survey entry questions. Counts.**

| To avoid answering the entire questionnaire for multiple FRIPRO applications, please select the correct category below. | Please confirm that the information in question 2, 3 and 4 below is correct. | | | |
|---|---|---|---|---|
| | Yes, correct or has been corrected by me | I cannot say | No reply | **Total** |
| I have received this questionnaire only and can answer for the application specified above | 929 | 25 | 0 | **954** |
| I have received multiple questionnaires and want to complete the entire questionnaire for the application specified above. | 244 | 1 | 1 | **246** |
| I have already completed the entire questionnaire for another application (you will be directed to the application specific questions) | 206 | 5 | 2 | **213** |
| I don't know this application (you will be directed to the last page of the survey) | 12 | 21 | 2 | **35** |
| No reply | 30 | 27 | 7 | **64** |
| **Total** | **1421** | **79** | **12** | **1512** |

Source: Survey to FRIPRO applicants 2005-2007.

The table below shows response rates for funded and rejected applications by research area. Response rates are calculated from positive replies (not including those who did not know the applications, se note to the table) as proportion of the total sample of applicants 2005 to 2007. This gives an overall response rate at 55 per cent[5]. The response rate is substantially higher for funded than for not funded applications (71 versus 52 per cent). There is some variation between research areas, but no areas have a response rate below 50 per cent.

It should be added that the actual number of replies varies substantially between the survey questions. Different groups of respondents were directed to different sets of questions, and respondents could skip questions they did not want to reply to. Of the 1512 total responses, 271 are from respondents who did not complete the last page of the questionnaire.

[5] Compared to the adjusted response rate at 64 per cent reported above. The different basis for calculating the response rate is explained in the note to Table 1.3.

**Table 1.3 Response rate by field and by funded/not funded application. Per cent.**

| Research area* | Funded FRIPRO application | Response rate | N |
|---|---|---|---|
| | No | 48.4 | 440 |
| | Yes | 82.1 | 56 |
| Humanities | Total | 52.2 | 496 |
| | No | 52.1 | 755 |
| | Yes | 67.6 | 173 |
| Natural sciences | Total | 55.0 | 928 |
| | No | 54.3 | 576 |
| | Yes | 70.2 | 121 |
| Medical sciences | Total | 57.1 | 697 |
| | No | 49.7 | 429 |
| | Yes | 72.1 | 61 |
| Social science | Total | 52.4 | 490 |
| | No | 50.0 | 74 |
| | Yes | 50.0 | 10 |
| Engineering sciences | Total | 50.0 | 84 |
| Agriculture and fishery | No | 100.0 | 4 |
| | No | 51.5 | 2278 |
| | Yes | 70.5 | 421 |
| **Total** | **Total** | **54.5** | **2699** |

Source: Survey to FRIPRO applicants 2005-2007. Response rates are calculated from the total sample of applicants 2005 to 2007 (regardless of valid e-mail addresses or other reasons for exclusion from the sample). Only respondents replying to at least one of the entering questions (Table 1.2) and not replying that they don't know the application, are counted as replies (in total 1470 respondents).
*The categories in the RCN application data base are applied. No funded application was categorised within agriculture and fishery.

## Bibliometric study

The publication, citation and co-author profiles of both funded and rejected principle investigators (PI) were studied based on the *National Citation Report for Norway (NCR),* a bibliographic database of all scientific journal articles that have been indexed for *ISI Web of Science* since 1981 with at least one address indicating an institutional affiliation in Norway. In the ten year period selected for analysis here, 2001-2010, the database consists of 72 263 articles. Of these, 22 030 articles (30.4 per cent) have been matched (using author names) with the principal investigators (PIs) included in this study and selected for further analysis.

The analyses comprise the same sample of FRIPRO applications as for the survey described above, i.e. 2005 to 2007. To study outcomes, publication patterns before and after the application year are compared.

The PI's of the FRIPRO applications and their scientific articles, not their projects, constitute the main unit of study in the bibliometric analysis. The PI's are divided in two partly overlapping groups, depending on funding versus rejection of their applications. The articles are divided into two five year periods in order to detect possible changes after funding or rejection.

The names of PI's were matched to author names in two iterations. First, the full names were converted into the form appearing in the database, e.g. 'Nils Christian Stenseth > 'Stenseth, NC'. Possible heteronyms for the same author in the database were checked, e.g. 'Stenseth, N'. In a second iteration, all the bibliographic records that could be matched this way were checked for possible homonyms. For example, 'Hansen, A' might represent two or more Norwegian researchers.

The *ISI Web of Science* represents the scientific production in the natural science and medicine much better than in other areas. Compared to complete data for scientific publications recorded at the institutional level in Norway (Cristin database), the following shares of the journals articles (and of all scientific publications, including books) are covered by the ISI Web of Science (Sivertsen 2009): Natural sciences: 90 per cent (81 per cent); Health sciences: 84 per cent (75 per cent); Engineering

sciences: 86 per cent (63 per cent); Social sciences: 67 per cent (48 per cent); Humanities: 18 per cent (9 per cent). Not surprisingly, a number of PI's in the last mentioned fields could not be identified with publications in the NCR database. In addition, for those that could be identified, we found a very limited number of publications even on the level of disciplines in several instances. We found that our analysis would not give representative results in the humanities and in several subfields in the social sciences. The number of PI's that have been excluded from the bibliometric analysis because of limited coverage of publications in their discipline, or because their names could not be matched to any publication in the database, are: Humanities: 356 (100 per cent); Agriculture and Fishing: 4 (100 per cent); Social Sciences: 240 (62 per cent); Engineering sciences: 18 (24 per cent); Natural Sciences: 53 (8 per cent); Health sciences: 32 (7 per cent). In the social sciences, only disciplines with more than two thirds of the PI's identified in the database were included. All disciplines were aggregated or specialties in the database were aggregated to a more limited number of subfields. The material for the bibliometric analysis can thereby be given as follows in Table 1.4.:

**Table 1.4 Principal Investigators and articles included in the bibliometric analysis, by research area**

| Area | Subfield | Principal Investigators | Articles |
|---|---|---|---|
| Natural sciences | Basic biosciences | 156 | 3367 |
| | Biology | 142 | 3104 |
| | Physics | 74 | 2958 |
| | Geosciences | 54 | 1034 |
| | Informatics | 35 | 606 |
| | Chemistry | 73 | 2823 |
| | Mathematics | 34 | 528 |
| | Interdisciplinary Nat Sciences | 44 | 1046 |
| Medical sciences | Biomedicine | 279 | 6796 |
| | Pharmacology & Toxicology | 15 | 356 |
| | Clinical Sciences | 110 | 3845 |
| | Social Medicine and Epidemiology | 78 | 2598 |
| | Psychology | 35 | 627 |
| Social science | Economics | 39 | 272 |
| | Political Science | 40 | 283 |
| | Interdisciplinary Soc Sciences | 38 | 258 |
| Engineering Sciences | Engineering Sciences | 85 | 1807 |
| **Sum** | | **1331** | **32308** |
| **Total unique** | | **1190** | **22030** |

Of the 1 190 PI's included in the bibliometric analysis, there are 1 034 PIs with rejected applications and 285 PIs with funded applications. 129 PIs appear in both groups.

## Interviews

Three sets of key stakeholders were selected for informant interviews:

- The research institutions: 9 interviews with deans and heads of department at relevant research institutions (phone interviews).
- Project managers/PIs: 7 interviews with FRIPRO applicants 2005-2007 (phone interviews).
- RCN: 8 interviews with chairs of FRIPRO expert committees and RCN employees organising the FRIPRO scheme (four face-to-face, three phone interviews and one via e-mail).

The interviews were useful for elaborating the informants' experiences and views concerning FRIPRO, and especially different practices and needs across research fields. The interview with PIs focused on how the projects described in their FRIPRO applications related to their other projects and their publications. The interviews were semi-structured with content and time differing between the

informants groups (the shortest project managers interviews lasted 0.15 hour, the longest RCN interviews 1.5 hours). An overview of the informants is given in Appendix 3.

### Data limitations

The data sources applied addressing the many research questions of this evaluation are generally of high quality, but there are several questions in the ToR on which we cannot fully conclude with available data. To properly address the question about the scientific quality of the funded projects would demand a scientific review of the implemented projects. This is outside the scope of this evaluation. Scientific quality is addressed in terms of quantitative analysis of the international scientific publications (publication and citation rates) of the principal investigators of the projects, as described above. The bibliometric data are not linked to the specific FRIPRO funding, nor do it cover all research fields. To complement the results of the bibliometric analysis, we use applicants' survey replies describing the outcome and characteristics of their FRIPRO projects in comparisons to their other projects, as well as interview data on the link between funding and publications.

Whereas the use of multiple data sources improves the bases for conclusions, data limitations also concern the survey data. As mentioned above, timing is a dilemma when using survey data to study the outcome of research funding (completed projects able to report results versus recent enough for applicants to recall the application). Quite a few of the applicants receiving the questionnaire reported back that they could not recall the application or the details needed to answer (part of) the questionnaire. As could be expected, the response rates for the non-funded projects are substantially lower than for the funded projects. Moreover, we expect that some of the most 'active' applicants – those who submit a large number of applications to different schemes every year and manage many project grants in parallel – have not answered the survey, both because they have difficulties recalling a specific application and distinguishing one project grant from other, and because they might find the evaluation of FRIPRO less important.

Moreover, concerning the study of impacts of the FRIPRO scheme, a more robust research design would be required to investigate *causal effects* of FRIPRO, providing baseline and time series data of the PIs' activities and funding prior to the submission of the application (roughly covering a time period of up to 10 years). An ex post impact research design, investigating the long term effects of the program is however not feasible within this evaluation. Given such constraints, we are unable to rule out that other factors not investigated, may give other conclusions concerning the impact of the FRIPRO scheme.

For one specific question in the ToR – the moderate quotas employed for post-doctoral candidates with professional educations in medicine, odontology and psychology – little quantitative data are provided, and the assessments are based on information provided in interviews and on general knowledge.

It should be added that the analysis does not include data on the FRIPRO application review process. Panel review reports and ratings could provide additional basis for analysis of scientific quality and impact, the review of interdisciplinary applications and the emphasis on scientific renewal in the panel assessments. More specifically, an interesting follow-up would be to study effects of high versus low rated applications (and not simply funded and non-funded applications), and to compare the reviewer rates and comments for the group of unsuccessful applicants who are identified with an increase in citation rate in the present bibliometric data, and the group of successful applicants who appear without an increase in citations after the FRIPRO funding.

# 2 Research quality

The FRIPRO scheme aims to promote research of high scientific quality and the development of basic theory and methods and scientific renewal. In this chapter we examine to what extent this is achieved. We start with summary findings, combining findings from the various data sources (Section 2.1). The next sections elaborate findings for each of the data sources: analyses of the FRIPRO application portfolio (Section 2.2), bibliometric analyses (Section 2.3) and survey replies and interviews (Section 2.4).

## 2.1 Main findings

### Good track record, but no measurable effect on citations

When measuring the contribution to scientific quality in terms of international scientific publications, we find that FRIPRO supports the researchers with the best track record, but FRIPRO funding does not seem to have measurable effect on the researchers' publication rate or citation rate.

Comparison of the publications rate of PIs (principal investigators) who have applied for FRIPRO projects show a 66 per cent higher rate per PI for those who obtained funding than for rejected applicants. Hence, the most productive researchers are supported. The differences in productivity between successful and unsuccessful applicants are generally the same throughout the years 2001-2010, indicating that a successful application does not change the productivity rate in most instances. In absolute numbers, the increase in scientific publications between the two periods is in fact higher for the unsuccessful applicants: 47 per cent versus 39 per cent.

Comparisons based on field relative citation index show that successful FRIPRO applicants are cited 43 per cent above the world average, while the unsuccessful applicants are cited 31 per cent above. The average article from Norway is cited 19 per cent over the world average by the same measure. This means that the successful applicants are somewhat more cited than the unsuccessful. The analyses also show that the successful applicants publish in journals that are somewhat more cited. Both groups of applicants stand out from the Norwegian average in this respect by publishing in more cited journals and receiving more citations.

In both groups of PIs, there is no significant change in the field-normalized relative citation rates before (2001-2005) and after (2006-2009) the funding or rejection of applications. Clear changes are only observed at the subfield level, but these changes may just as well lead in the same direction for the two groups as in different directions. Consequently, the funding or rejection of FRIPRO applications does not seem to have measurable effect on the citation rates of the PIs' publications.

A larger share of the publications of successful applicants includes international co-authorship (58 per cent versus 49 per cent in the first period). The difference is reduced to 59 per cent versus 53 per cent in the second period. The percentages for the unsuccessful applicants are almost equal to the overall percentages for Norwegian articles in the two periods. Hence, the successful applicants have a higher degree of international collaboration, but this tendency does not seem to be affected by the funding itself.

### Scientific renewal and multidisciplinary

A considerable proportion of the applicants report that their FRIPRO projects are more oriented towards basic research, have higher scientific quality and provide more new scientific results, than their other projects.

Whereas effects of FRIPRO funding are not found in the bibliometric analysis, the survey data indicate substantial effects on research. Firstly, survey replies indicate positive effects on scientific renewal and multidisciplinarity. There is some indication that those who submit applications for projects which are more multidisciplinary than their ordinary research have a higher chance of obtaining FRIPRO funds than those who submit applications for projects which are less multidisciplinary than their ordinary research. Moreover, the funded applicants more often characterise their FRIPRO project as more scientifically risky and internationally orientated than their other projects. Moreover, as reported in Chapter 3, funded FRIPRO applicants more often than the rejected, consider that the project has explored new research areas important for future research and yielded unexpected important results.

When trying to explain the lack of measurable change in the bibliometric data, contrasting the positive survey replies, we find that researchers often have troubles linking specific funding sources and publications. Their research is funded by multiple sources and their publications are part of larger research 'projects'. In this context, untraceable changes in overall publication and citation rates need not imply lacking effects of FRIPRO funding. On the other hand, replying to a questionnaire for a specific funding scheme, respondents may easily 'over-report' – including all relevant results of their research regardless of funding source.

### Elitist funding

The analysis of FRIPRO success rates suggests an elitist funding scheme. The success rate is generally low, and has decreased during the studied period (from 19 per cent for applications in 2005 to 11 per cent for applications in 2010). The large majority of the applications come from the universities, and the universities also have the highest success rate. In total, the universities account for 86 per cent for the FRIPRO funding in the 6-year period. Institutions in Oslo alone account for 47 per cent for the funding. Both successful and unsuccessful applicants stand out from the Norwegian average by publishing in more cited journals and receiving more citations.

## 2.2 Evidence from the portfolio analysis

Application statistics and success rates do not say anything about the scientific quality of the research funded by FRIPRO. It still provides valuable information on who applies and who is assessed to have the best applications. In this section success rates for FRIPRO applications in the period 2005 to 2010 are presented. We analyse success by research area, institution, gender and age, as well as the overall distribution of funding by geography and institution.

Altogether the data base contains 6064 FRIPRO applications in the studied 6 year period – 900 to 1000 applications per year. The overall success rate has decreased: 18.5 per cent of the applications were funded in 2005, and only 11 per cent of the applications in 2010 (table below).

**Table 2.1 Success rates FRIPRO applications 2005-2010, by year.**

| Application year | Rejected | Funded | Not reviewed* | N |
|---|---|---|---|---|
| 2005 | 79.1 | 18.5 | 2.4 | 1053 |
| 2006 | 79.0 | 18.0 | 3.0 | 937 |
| 2007 | 79.7 | 13.4 | 6.8 | 922 |
| 2008 | 79.3 | 12.7 | 8.0 | 1019 |
| 2009 | 83.8 | 11.8 | 4.4 | 1066 |
| 2010 | 83.6 | 11.1 | 5.3 | 1067 |
| **Total%** | **80.8** | **14.2** | **5.0** | **100** |
| **Total #** | **4901** | **861** | **302** | **6064** |

Source: RCN application data.
*Include withdrawn ('trukket') and declined ('avvist') applications, as well other cases of non-reviewed applications ('lukket').

Compared with the success rates for Danish applications for research projects (DFF funding), competition appears harder for FRIPRO projects. The overall success rate for applications for DFF research projects was 20.9 per cent over the period 2005-2009, compared to 12.1 for FRIPRO for 2005-2010. However, success rates for DFF applications fell significantly to 11.9 per cent in 2009 from 21.7 per cent in 2008[6].

The majority of the FRIPRO applications concern research projects. There are also a substantial number of postdoc applications (1180), but fewer applications for individual PhD fellowships[7] and for events/conferences (table below). The success rate varies somewhat between the categories. Applications for individual PhD fellowships have the lowest overall success rate in the period, whereas the applications for support for events/conferences are the most successful.

In the remaining analyses in this section only applications for research projects, post docs and PhD fellowships are included.

**Table 2.2 Success rates FRIPRO applications 2005-2010, by type of application.**

| Type of application* | Rejected | Funded | Not reviewed | N |
|---|---|---|---|---|
| Research project | 83.6 | 12.1 | 4.3 | 4420 |
| Postdoc fellowship | 80.8 | 13.7 | 5.4 | 1180 |
| PhD fellowship | 82.5 | 8.1 | 9.4 | 234 |
| Mobility grant | 27.6 | 27.6 | 44.8 | 29 |
| Support for events/conferences | 25.1 | 67.8 | 7.0 | 199 |
| Other | | 50.0 | 50.0 | 2 |
| **Total%** | **80.8** | **14.2** | **5.0** | **100** |
| **Total #** | **4901** | **861** | **302** | **6064** |

Source: RCN application data.
*Norwegian terms: Forskerprosjekt (Research project); Postdoktorstipend (Postdoc fellowship); Doktorgradsstipend (PhD fellowship); Utenlandsstipend (Mobility grant); Arrangementsstøtte (Support for events/conferences).

The large majority are applications for amounts from 1 to 10 million NOK. Overall in the period the smallest projects have been the most successful – 17 per cent of them have obtained funding (only the three main application types are included, not the applications for events/conferences, table below).

[6] See Danish Agency for Science, Technology and Innovation, 2011. A key factor behind this fall from 2008 to 2009 for DFF success rates was a new rule limiting co-financing of projects by universities and other research institutions to a maximum of 10 per cent, which led to an increase in DFF funding per project.
[7] From 2006 individual applications for PhD fellowships was only accepted for candidates planning to take their degree abroad. Hence, PhD students at Norwegian institutions could only apply as part of a larger FRIPRO application/research project. From 2012, no individual applications for PhD fellowships are accepted.

**Table 2.3 Success rates FRIPRO applications 2005-2010, by size of application.**

| Amount applied for | Rejected | Funded | Not reviewed* | N |
|---|---|---|---|---|
| up to 1 MNOK | 66.2 | 16.9 | 16.9 | 130 |
| 1 to 2.4 MNOK | 79.2 | 13.2 | 7.5 | 1050 |
| 2.5 to 4.9 MNOK | 81.9 | 12.9 | 5.2 | 1939 |
| 5 to 9.9 MNOK | 86.8 | 11.1 | 2.1 | 2172 |
| 10 MNOK and more | 83.2 | 12.0 | 4.8 | 543 |
| **Total** | **83.0** | **12.3** | **4.7** | **5834** |

Source: RCN application data. Table includes applications for research projects, post doc projects and PhD projects (5834 of the 6064 applications in the period).
*Include withdrawn ('trukket') and declined ('avvist') applications, as well other cases of non-reviewed applications ('lukket').

There is a notable change towards larger projects in the 6-year period. There are fewer of the smallest applications, there are more large applications and the smallest applications have a lower success rate (for the other size categories the success also varies, but here are no clear trends, Table 2.4). At the same time, the average application size, as well as the average size of funded projects has increased (from 3.0 million to 5.6 million for the projects). The maximum project size is also increased, and the number of funded projects is reduced (Table 2.5).

**Table 2.4 Success rates FRIPRO applications 2005-2010, by year and size of application.**

| Amount applied for (NOK) | 2005 | | 2006 | | 2007 | | 2008 | | 2009 | | 2010 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | # Appl. | % Succ. | # Appl. | % Succ. | # Appl. | % Succ. | # Appl. | % Succ. | # Appl. | % Succ. | # Appl. | % Succ. |
| up to 1 mill | 46 | 13.0 | 34 | 23.5 | 17 | 23.5 | 11 | 27.3 | 12 | 8.3 | 10 | .0 |
| 1 to 2.4 mill | 351 | 18.5 | 244 | 12.7 | 158 | 10.1 | 124 | 6.5 | 83 | 8.4 | 90 | 13.3 |
| 2.5 to 4.9 mill | 372 | 18.5 | 338 | 17.5 | 301 | 11.6 | 339 | 9.1 | 287 | 9.1 | 302 | 9.9 |
| 5 to 9.9 mill | 229 | 12.2 | 251 | 15.9 | 351 | 11.4 | 401 | 13.7 | 474 | 8.9 | 466 | 7.7 |
| 10 mill and more | 7 | 14.3 | 18 | 5.6 | 64 | 15.6 | 115 | 10.4 | 178 | 14.6 | 161 | 9.3 |
| **Total** | **1005** | **16.8** | **885** | **15.7** | **891** | **11.8** | **990** | **11.0** | **1034** | **9.9** | **1029** | **9.0** |

Source: RCN application data. Table includes applications for research projects, post doc projects and PhD projects (5834 of the 6064 applications in the period).

In comparison, the average amounts applied for and funded for research projects are typically smaller for the Danish Council of Independent Research (DFF). For example, in 2005 the average amount applied for per project was NOK 2.8 million, with the average size of funded projects at 1.6 million[8]. In 2009[9], the average applied amount was 3.5 million and 3.0 million for funded projects. While research projects funded by FRIPRO are on average larger, a similar trend can be noted for both Norway and Denmark: funding per project has increased significantly over this period of 5-6 years.

**Table 2.5 FRIPRO application and project size 2005-2010, by year.**

| Year | N applications | Average MNOK applied per project | Average MNOK funded per project | Max MNOK per funded project | N funded projects |
|---|---|---|---|---|---|
| 2005 | 1005 | 3.6 | 3.0 | 9.1 | 169 |
| 2006 | 885 | 4.1 | 3.1 | 7.9 | 139 |
| 2007 | 891 | 5.3 | 4.2 | 10.9 | 105 |
| 2008 | 990 | 5.7 | 5.5 | 12.9 | 109 |
| 2009 | 1034 | 6.5 | 6.2 | 15.7 | 102 |
| 2010 | 1029 | 6.4 | 5.6 | 13.0 | 93 |
| **Total** | **5834** | **5.3** | **4.4** | **15.7** | **717** |

Source: RCN application data. Table includes applications for research projects, post doc projects and PhD projects (5834 of the 6064 applications in the period).

[8] Data based only on funding for research projects, and does not include post doc or PhD projects. An exchange rate of 1 NOK = 0.90 DKK is used for all calculations based on the Danish data.
[9] The year 2010 was not covered in the evaluation of DFF-funded research projects.

The success rate is somewhat lower within the humanities than within the natural sciences (9 versus 15 per cent), whereas in the other research areas the success rate is close to the overall average (11-12 per cent, table below).[10]

**Table 2.6 Success rates FRIPRO applications 2005-2010, by research area.**

| Research area | Rejected | Funded | Not reviewed | N |
|---|---|---|---|---|
| Humanities | 86.1 | 9.3 | 4.7 | 1047 |
| Natural sciences (incl. mathematics) | 81.9 | 15.1 | 3.0 | 1792 |
| Medical sciences | 82.7 | 11.7 | 5.6 | 1723 |
| Social sciences | 82.8 | 11.8 | 5.4 | 1018 |
| Engineering | 80.7 | 11.2 | 8.0 | 249 |
| Agriculture and fishery | 100.0 | | | 5 |
| **Total** | **83.0** | **12.3** | **4.7** | **5834** |

Source: RCN application data. Table includes applications for research projects, post doc projects and PhD project (5834 of the 6064 applications in the period).

The success rate for female PIs was somewhat higher than for male PIs within the humanities and engineering, and marginally higher within social sciences, but higher for male PIs than for female PIs within the other research areas (Table 7.1, Appendix 2).The overall figures show similar success rates regardless of gender (12.1 for females and 12.4 for males). Splitting on project types, there are, however, differences. Female are clearly more successful than males when applying for the individual PhD fellowships, marginally less successful when applying for research projects, and close to equally successful when applying for postdocs (Table 2.7). More notably, there is a tendency of increasing female success during the period. Whereas the male success rate was higher than the female success rate in the first part of the period, the female success rate was higher than the male success rate in 2007, 2008 and 2010 (Table 4.6).

There are also notable differences by age and gender. Whereas the youngest male and female applicants are equally successful, among applicants between 30 and 49 years old, women are more successful than men. For applicants above 50, and especially for the applicants above 60, men are more successful than women (Table 7.2, Appendix 2).

**Table 2.7 Success rates FRIPRO applications 2005-2010, by type of application and PI's gender.**

| Type of application | Gender PI | Rejected | Funded | Not reviewed | N |
|---|---|---|---|---|---|
| PhD fellowship | Women | 85.1 | 10.5 | 4.4 | 114 |
| | Men | 80.0 | 5.8 | 14.2 | 120 |
| | Total | 82.5 | 8.1 | 9.4 | 234 |
| Research project | Women | 84.8 | 11.6 | 3.6 | 1343 |
| | Men | 83.1 | 12.4 | 4.5 | 3073 |
| | Unknown | 50.0 | | 50.0 | 4 |
| | Total | 83.6 | 12.1 | 4.3 | 4420 |
| Postdoc fellowship | Women | 79.8 | 13.6 | 6.6 | 574 |
| | Men | 81.8 | 13.9 | 4.3 | 604 |
| | Unknown | 100.0 | | | 2 |
| | Total | 80.8 | 13.7 | 5.4 | 1180 |
| Total | Women | 83.4 | 12.1 | 4.5 | 2031 |
| | Men | 82.8 | 12.4 | 4.8 | 3797 |
| | Unknown | 66.7 | | 33.3 | 6 |
| | Total | 83.0 | 12.3 | 4.7 | 5834 |

Source: RCN application data. Table includes applications for research projects, post doc projects and PhD project (5834 of the 6064 applications in the period).

The large majority of the applications come from the universities (4455 of 5834). The universities also have the highest success rate. There are few applications from other sectors, and generally these

[10] We have not studied the multidisciplinarity of the proposed projects. In a previous study we found that the multi- and interdisciplinarity are underreported in the RCN application data base and that the data are not adequate for analysis of success rates for these groups (Langfeldt and Røste 2009).

applications have low success rates – e.g. 2 per cent for the colleges and university colleges, and 8 per cent for the specialised university institutions. None of the applications from industry was funded.

**Table 2.8 Success rates FRIPRO applications 2005-2010, by sector.**

| Sector* | Rejected | Funded | Not reviewed | N |
|---|---|---|---|---|
| Universities | 82.0 | 13.3 | 4.7 | 4455 |
| Specialised university institutions | 88.2 | 7.5 | 4.3 | 93 |
| University colleges/colleges | 91.7 | 2.1 | 6.3 | 144 |
| Institute sector | 86.9 | 9.4 | 3.6 | 827 |
| Hospitals | 75.0 | 12.5 | 12.5 | 16 |
| Industry | 65.0 | .0 | 35.0 | 20 |
| Abroad | 88.1 | 9.0 | 2.8 | 177 |
| Other | 74.5 | 18.6 | 6.9 | 102 |
| **Total** | **83.0** | **12.3** | **4.7** | **5834** |

Source: RCN application data. Table includes applications for research projects, post doc projects and PhD project (5834 of the 6064 applications in the period).
*Institutional category 2011 is applied, i.e. not the institutional status at the time of application.

There are also notable differences between the universities. UMB has few applications, but the highest success rate (19 per cent, table below). UiO accounts for a large part of the applications and have the second highest success rate (15 per cent). The newer universities have few applications, and – with the exception of UiN – the lowest success rates.

**Table 2.9 Success rates FRIPRO applications 2005-2010 from universities, by institution.**

| Institution | Rejected | Funded | Not reviewed | N |
|---|---|---|---|---|
| UiO | 81.5 | 14.5 | 3.9 | 1966 |
| UiB | 83.6 | 11.6 | 4.8 | 1103 |
| NTNU | 80.3 | 13.5 | 6.1 | 651 |
| UiT | 83.7 | 11.9 | 4.4 | 411 |
| UMB | 77.8 | 18.6 | 3.6 | 167 |
| UiS | 80.0 | 7.0 | 13.0 | 100 |
| UiA | 90.7 | 2.3 | 7.0 | 43 |
| UiN | 85.7 | 14.3 | 0.0 | 14 |
| **Total** | **82.0** | **13.3** | **4.7** | **4455** |

Source: RCN application data. Table includes applications from today's Norwegian universities (regardless of institutional category at the time of applications) for research projects, post doc projects and PhD project (4455 of the 6064 applications in the period).

As shown in the table below, the universities' share of the FRIPRO funding is much higher than their share of other RCN (programme) funding (86 versus 32 per cent). The difference is particularly large for UiO: UiO has attracted 41 per cent of all FRIPRO funding in the 6-year period, but only 11 per cent of the funding from other RCN schemes. For the institute sector we find the inverse funding profile: the institutes have attracted 11 per cent of all FRIPRO funding, and 31 per cent of the funding from other RCN schemes.

**Table 2.10 FRIPRO and RCN programme funding 2005-2010, by beneficiary institution.**

| | RCN programmes 2005-2010 | | FRIPRO 2005-2010 | |
|---|---|---|---|---|
| **(Type of) Institution** | Funding MNOK | Per cent | Funding NOK | Per cent |
| Universities | 5 312.9 | 32.7 | 2 385.3 | 86.3 |
| UiO | 1 747.0 | 10.8 | 1 143.4 | 41.4 |
| UiB | 1 303.6 | 8.0 | 547.4 | 19.8 |
| NTNU | 1 222.9 | 7.5 | 387.2 | 14.0 |
| UiT | 469.6 | 2.9 | 209.8 | 7.6 |
| UMB | 464.9 | 2.9 | 68.4 | 2.5 |
| UiS | 54.3 | 0.3 | 20.0 | 0.7 |
| UiA | 50.6 | 0.3 | 9.2 | 0.3 |
| Specialised University Institutions | 276.9 | 1.7 | 16.2 | 0.6 |
| University Colleges/Colleges | 318.1 | 2.0 | 23.8 | 0.9 |
| Institute sector | 5 581.4 | 34.4 | 306.2 | 11.1 |
| Hospitals (excl. univ. hospitals) | 33.7 | 0.2 | 0.0 | 0.0 |
| Industry | 4 168.2 | 25.7 | 2.5 | 0.1 |
| Other | 544.2 | 3.3 | 27.1 | 1.0 |
| Abroad | 12.2 | 0.1 | 1.8 | 0.1 |
| **Total** | **16 247.7** | **100** | **2 762.9** | **100** |

Source: http://statistikkbank.forskningsradet.no

The table below shows the geographical distribution of the FRIPRO funding compared to other RCN schemes.[11] As expected, the allocation follows the locations of the four older universities. Oslo, Hordaland (Bergen[12]) and Troms (Tromsø) have received a larger proportion of FRIPRO funding than they have of RCN programme funding, whereas all the other counties have received relatively less FRIPRO funding than other funding (with the exception of Finnmark where the proportion is equally small for PRIPRO and RCN-programmes). Oslo alone accounts for close to half of the FRIPRO-funding in the period (47 per cent).

**Table 2.11 FRIPRO and RCN programme funding 2005-2010 by county.**

| | RCN programmes 2005-2010 | | FRIPRO 2005-2010 | |
|---|---|---|---|---|
| **County** | Funding MNOK | Per cent | Funding MNOK | Per cent |
| AKERSHUS | 1 942.8 | 12.0 | 102.9 | 3.7 |
| AUST-AGDER | 70.2 | 0.4 | 3.9 | 0.1 |
| BUSKERUD | 187.1 | 1.2 | 0.1 | 0.0 |
| FINNMARK | 36.3 | 0.2 | 4.9 | 0.2 |
| HEDMARK | 123.4 | 0.8 | 0.0 | - |
| HORDALAND | 2 347.8 | 14.5 | 596.0 | 21.6 |
| MØRE OG ROMSDAL | 281.0 | 1.7 | 5.5 | 0.2 |
| NORDLAND | 98.3 | 0.6 | 7.8 | 0.3 |
| NORD-TRØNDELAG | 85.7 | 0.5 | 0.0 | - |
| OPPLAND | 210.5 | 1.3 | 0.0 | - |
| OSLO | 4 887.4 | 30.1 | 1 309.4 | 47.4 |
| ROGALAND | 750.6 | 4.6 | 20.3 | 0.7 |
| SOGN OG FJORDANE | 61.2 | 0.4 | 0.0 | - |
| SVALBARD | 36.5 | 0.2 | 4.1 | 0.1 |
| SØR-TRØNDELAG | 3 478.8 | 21.4 | 462.5 | 16.7 |
| TELEMARK | 203.1 | 1.2 | 0.0 | - |
| TROMS | 1 021.1 | 6.3 | 230.1 | 8.3 |
| VEST-AGDER | 150.7 | 0.9 | 9.3 | 0.3 |
| VESTFOLD | 169.9 | 1.0 | 5.9 | 0.2 |
| ØSTFOLD | 105.4 | 0.6 | 0.1 | 0.0 |
| **Total** | **16 247.7** | **100** | **2 762.9** | **100** |

Source: http://statistikkbank.forskningsradet.no

[11] The applications data set prepared by RCN for this evaluation contain limited geographical information, hence, we do not have *success rates* by region or county.
[12] Bergen accounts for all of the FRIPRO funding to Hordaland, and Tromsø all the FRIPRO funding to Troms.

## 2.3 Bibliometric evidence

As explained in the introduction, the data source for the bibliometric analysis, which is based on ISI Web of Science, represents the scientific production in the natural science and medicine much better than in other areas. The results presented here are therefore mainly influenced by the practices and performances of the natural and health sciences. Keeping this limitation in mind, it should also be noted that the publications of FRIPRO applicants included in the analysis represents more than 30 per cent of the total publication output from Norway in the same database and period (2001-2010). This is an indication that FRIPRO applicants represent a broad group of Norwegian researchers.

### Productivity

As seen in Table 2.12, the number of publications per PI (Principal Investigator) is in general 66 per cent higher for PIs with funded projects compared to rejected applicants. Higher productivity for funded PIs was also found in the Danish evaluation of DFF funding.[13] Deviations from the general pattern may occur in subfields with a smaller number of applicants, reminding us that the applicants are heterogeneous with regard to age, position and previous academic career.

**Table 2.12 FRIPRO applicants (2005-2007): Number of publications per PI 2001-2010, funded and rejected applications by research field**

| | # Applicants | | Articles per PI | | | Total number of articles | |
|---|---|---|---|---|---|---|---|
| **Subfield** | **Funded** | **Rejected** | **Funded** | **Rejected** | **Difference** | **Funded** | **Rejected** |
| Basic biosciences | 40 | 142 | 27.5 | 19.9 | 38 % | 1101 | 2823 |
| Biology | 31 | 135 | 37.8 | 18.4 | 106 % | 1173 | 2485 |
| Physics | 28 | 58 | 51.1 | 32.1 | 59 % | 1430 | 1860 |
| Geosciences | 14 | 43 | 24.6 | 15.4 | 60 % | 344 | 661 |
| Informatics | 11 | 28 | 27.6 | 13.5 | 105 % | 304 | 377 |
| Chemistry | 27 | 60 | 44.9 | 33.7 | 33 % | 1211 | 2019 |
| Mathematics | 13 | 25 | 14.2 | 16.9 | -16 % | 184 | 423 |
| Interdisciplinary Nat Sciences | 9 | 42 | 49.8 | 22.8 | 118 % | 448 | 957 |
| Biomedicine | 72 | 247 | 27.1 | 19.1 | 42 % | 1951 | 4711 |
| Pharmacology & Toxicology | 4 | 14 | 22.8 | 24.7 | -8 % | 91 | 346 |
| Clinical Sciences | 27 | 95 | 42.9 | 31.5 | 36 % | 1157 | 2995 |
| Social Medicine and Epidemiology | 20 | 70 | 43.1 | 32.1 | 34 % | 861 | 2247 |
| Psychology | 8 | 29 | 23.6 | 15.8 | 50 % | 189 | 458 |
| Economics | 6 | 38 | 8.2 | 6.7 | 23 % | 49 | 253 |
| Political Science | 6 | 37 | 6.3 | 6.8 | -7 % | 38 | 253 |
| Interdisciplinary Soc Sciences | 7 | 36 | 11.0 | 6.2 | 78 % | 77 | 222 |
| Engineering Sciences | 20 | 71 | 23.0 | 22.1 | 4 % | 460 | 1568 |
| **All publications** | **285** | **1034** | **30.5** | **18.4** | **66 %** | **8705** | **19003** |

Source: NCR Norway/NIFU/Thomson Reuters. PIs' publications from 2001-2010 are included.

[13] Still, the evaluation of DFF funding used found significant effects for other measures of productivity (Danish Agency for Science, Technology and Innovation, 2011). The DFF study used a somewhat different approach in their bibliometric analysis, which complicates comparison. The DFF evaluation analysed publication activity only for a subgroup of rejected and funded applicants. The two groups were matched according to a range of background characteristics and thereafter compared in terms of publication activity before and after grant application. Typically, such a matching procedure will reduce differences between groups compared to the full population.

As seen in Table 2.13, the differences in productivity between successful and unsuccessful applicants are generally the same throughout the years 2001-2010, indicating that a successful application does not change the productivity rate in most instances. This finding is also in accordance with the results of the Danish study.[14] Again, there are deviances from the general pattern in subfields with fewer applicants and publications in the database.

In absolute numbers, the increase in scientific publications between the two periods is in fact higher for the unsuccessful applicants: 47 per cent versus 39 per cent. The general increase for all articles from Norway is also 47 per cent.

**Table 2.13 FRIPRO applicants (2005-2007): Change in productivity rate by research field and funded and rejected PI.**

| | 2001-2005 | | 2006-2010 | | Change | |
|---|---|---|---|---|---|---|
| **Subfield** | **Funded PI** | **Rejected PI** | **Funded PI** | **Rejected PI** | **Funded PI** | **Rejected PI** |
| Basic biosciences | 12.7 | 9.1 | 16.3 | 12.0 | 28 % | 32 % |
| Biology | 17.0 | 8.5 | 22.1 | 11.3 | 30 % | 34 % |
| Physics | 22.4 | 14.3 | 30.5 | 19.5 | 36 % | 36 % |
| Geosciences | 11.2 | 7.7 | 14.2 | 8.4 | 27 % | 8 % |
| Informatics | 11.4 | 6.4 | 17.3 | 8.2 | 52 % | 27 % |
| Chemistry | 18.5 | 13.6 | 26.3 | 20.8 | 42 % | 53 % |
| Mathematics | 6.7 | 7.4 | 9.5 | 10.5 | 43 % | 41 % |
| Interdisciplinary Nat Sciences | 24.8 | 10.5 | 31.3 | 14.6 | 26 % | 39 % |
| Biomedicine | 12.8 | 8.7 | 15.2 | 11.2 | 18 % | 28 % |
| Pharmacology & Toxicology | 10.8 | 11.6 | 12.0 | 13.1 | 12 % | 12 % |
| Clinical Sciences | 18.6 | 14.0 | 25.0 | 18.3 | 34 % | 30 % |
| Social Medicine and Epidemiology | 17.1 | 11.9 | 26.8 | 21.0 | 57 % | 77 % |
| Psychology | 9.0 | 7.8 | 14.6 | 9.9 | 63 % | 27 % |
| Economics | 2.4 | 3.0 | 6.2 | 4.6 | 157 % | 52 % |
| Political Science | 3.2 | 3.4 | 3.7 | 5.1 | 15 % | 49 % |
| Interdisciplinary Soc Sciences | 5.6 | 3.3 | 8.2 | 4.2 | 46 % | 29 % |
| Engineering Sciences | 12.0 | 9.4 | 14.0 | 15.8 | 17 % | 69 % |
| **All publications** | **14.1** | **8.4** | **18.1** | **11.3** | **29 %** | **34 %** |

Source: NCR Norway/NIFU/Thomson Reuters. PIs' publications from 2001-2010 are included.

## Citation impact

Citation impact has been counted per article at the end of 2010. Only publications from 2001-2009 are included in the analysis. Citation counts have been normalised by comparing them with the average in the same year for all articles in the same journal (Jnl rel cit) or subfield (Fld rel cit). The actual number is divided by the average, meaning that 1.00 equals that average and that 1.15 represents a score 15 per cent over the average. The two indicators are calculated as the average during the period of the averages for each year, thereby giving each year the same weight in the calculations.

[14] In both cases the average number of publications per PI is substantially higher for funded applicants compared to rejected applicants: 38 per cent higher for DFF (based on the matched sample) and 66 per cent higher for FRIPRO (based on the full sample). The difference in productivity for funded and rejected PIs for DFF is greater in the period after application than before, however the difference is moderate (and not statistically significant). This is thus similar to the finding for FRIPRO that productivity differences are generally the same over time.

The results are shown in Table 2.14. Using the journal normalization, both groups of applicants are cited 13-14 per cent above the world average, while the average relative citation rate for Norwegian articles in general is almost the same, 11 per cent above the world average. The field normalization, however, gives different results: The successful applicants are cited 43 per cent above the world average, while the unsuccessful applicants are cited 31 per cent above. The average article from Norway is cited 19 per cent over the world average by the same measure. This means that the successful applicants are somewhat more cited than the unsuccessful and also that the successful applicants publish in journals that are slightly more cited. Both groups of applicants stand out from the Norwegian average in this respect by publishing in more cited journals and receiving more citations.

The Danish evaluation of DFF funding also found a higher citation rate for the publications of successful applicants. Both the DFF and FRIPRO analyses show that citation rates (normalised by field) are higher for funded applicants compared to rejected applicants. Differences are greater for the matched DFF sample: 25 per cent higher for DFF (based on the matched sample) and 12 per cent higher for FRIPRO (based on the full sample). However, it should again be kept in mind that differences in the approaches used means that these results are not fully comparable.

**Table 2.14 FRIPRO applicants (2005-2007): Journal-normalized and field-normalized relative citation rates 2001-2009 by research field and funded and rejected PI.**

| | #Articles | | Jnl rel cit | | Fld rel cit | |
|---|---|---|---|---|---|---|
| **Subfield** | **Funded PI** | **Rejected PI** | **Funded PI** | **Rejected PI** | **Funded PI** | **Rejected PI** |
| Basic biosciences | 950 | 2463 | 1.13 | 1.16 | 1.43 | 1.26 |
| Biology | 1032 | 2172 | 1.07 | 1.13 | 1.36 | 1.34 |
| Physics | 1290 | 1674 | 0.92 | 0.98 | 1.35 | 1.18 |
| Geosciences | 290 | 586 | 1.19 | 1.23 | 1.80 | 1.67 |
| Informatics | 268 | 339 | 1.51 | 1.03 | 1.39 | 1.08 |
| Chemistry | 1056 | 1776 | 1.12 | 1.05 | 1.29 | 1.13 |
| Mathematics | 154 | 372 | 1.09 | 1.39 | 1.25 | 1.52 |
| Interdisciplinary Nat Sciences | 397 | 836 | 1.00 | 1.17 | 1.44 | 1.37 |
| Biomedicine | 1716 | 4116 | 1.05 | 1.11 | 1.45 | 1.33 |
| Pharmacology & Toxicology | 82 | 311 | 0.86 | 1.14 | 1.04 | 1.05 |
| Clinical Sciences | 1007 | 2644 | 1.21 | 1.17 | 1.52 | 1.41 |
| Social Medicine and Epidemiology | 740 | 1935 | 1.25 | 1.22 | 1.61 | 1.45 |
| Psychology | 156 | 404 | 1.01 | 0.92 | 1.08 | 0.98 |
| Economics | 38 | 222 | 1.30 | 1.23 | 1.09 | 1.07 |
| Political Science | 33 | 219 | 1.27 | 1.25 | 1.46 | 1.68 |
| Interdisciplinary Soc Sciences | 71 | 197 | 1.52 | 1.36 | 1.70 | 2.08 |
| Engineering Sciences | 397 | 1365 | 1.08 | 1.18 | 1.12 | 1.54 |
| **All publications** | **8705** | **19003** | **1.14** | **1.13** | **1.43** | **1.31** |

Source: NCR Norway/NIFU/Thomson Reuters. PIs' publications from 2001-2009 are included. Citation impact counted per article after the end of 2010.

In both groups of PIs, there is no significant change in the field-normalized relative citation rates between the period before (2001-2005) and after (2006-2009) the funding or rejection of applications, as seen in the scores for the totals in Table 2.15. Clear changes are only observed at the subfield level, but these changes may just as well lead in the same direction for the two groups as in different directions. Consequently, the funding or rejection of FRIPRO applications does not seem to have a measurable effect on the citation rates of the publications of the PIs.

**Table 2.15 FRIPRO applicants (2005-2007): Change in field-normalized relative citation rate by research field and funded and rejected PI.**

| | 2001-2005 | | 2006-2009 | | Change | |
|---|---|---|---|---|---|---|
| **Subfield** | **Funded PI** | **Rejected PI** | **Funded PI** | **Rejected PI** | **Funded PI** | **Rejected PI** |
| Basic biosciences | 1.29 | 1.12 | 1.48 | 0.97 | 15 % | -14 % |
| Biology | 1.36 | 1.12 | 1.24 | 1.12 | -9 % | 0 % |
| Physics | 1.03 | 1.21 | 1.51 | 1.90 | 47 % | 57 % |
| Geosciences | 1.58 | 1.38 | 1.27 | 1.34 | -19 % | -3 % |
| Informatics | 1.57 | 1.41 | 1.47 | 1.23 | -6 % | -13 % |
| Chemistry | 1.16 | 1.11 | 0.90 | 0.98 | -22 % | -11 % |
| Mathematics | 1.50 | 1.39 | 1.46 | 1.40 | -3 % | 1 % |
| Interdisciplinary Nat Sciences | 1.42 | 1.42 | 1.86 | 1.51 | 31 % | 6 % |
| Biomedicine | 1.42 | 1.21 | 1.47 | 1.28 | 3 % | 6 % |
| Pharmacology & Toxicology | 1.37 | 1.45 | 1.38 | 1.29 | 1 % | -11 % |
| Clinical Sciences | 1.32 | 1.10 | 1.41 | 1.50 | 6 % | 37 % |
| Social Medicine and Epidemiology | 1.44 | 1.61 | 2.22 | 1.81 | 53 % | 13 % |
| Psychology | 0.92 | 1.04 | 1.38 | 0.89 | 50 % | -14 % |
| Economics | 0.95 | 1.12 | 1.32 | 1.01 | 39 % | -9 % |
| Political Science | 1.27 | 2.48 | 1.70 | 1.39 | 34 % | -44 % |
| Interdisciplinary Soc Sciences | 1.37 | 2.52 | 2.11 | 1.59 | 54 % | -37 % |
| Engineering Sciences | 1.14 | 1.53 | 1.08 | 1.62 | -6 % | 6 % |
| **All publications** | **1.41** | **1.35** | **1.45** | **1.34** | **3 %** | **-1 %** |

Source: NCR Norway/NIFU/Thomson Reuters. PIs' publications from 2001-2009 are included. Citation impact counted per article after the end of 2010.

## Publications with international collaboration

As seen in Table 2.16, the publications by successful applicants exhibit international collaboration to a higher degree than those by unsuccessful applicants. Publications with international collaboration as a share of all publications are 58 per cent versus 49 per cent in the first period. The difference is reduced to 59 per cent versus 53 per cent in the second period. The percentages for the unsuccessful applicants are almost equal to the percentages for Norwegian articles in general in the two periods. The successful applicants have a higher degree of international collaboration, but this tendency does not seem to be affected by the funding itself.

**Table 2.16 FRIPRO applicants (2005-2007): Publications with international co-authorship as share of total publications by research field and funded and rejected PI.**

| | 2001-2005 | | 2006-2010 | | Change | |
|---|---|---|---|---|---|---|
| **Subfield** | **Funded PI** | **Rejected PI** | **Funded PI** | **Rejected PI** | **Funded PI** | **Rejected PI** |
| Basic biosciences | 59 % | 48 % | 59 % | 50 % | -1 % | 3 % |
| Biology | 56 % | 53 % | 59 % | 58 % | 7 % | 9 % |
| Physics | 82 % | 74 % | 79 % | 76 % | -3 % | 2 % |
| Geosciences | 65 % | 52 % | 68 % | 57 % | 5 % | 11 % |
| Informatics | 72 % | 46 % | 71 % | 45 % | -2 % | -2 % |
| Chemistry | 63 % | 47 % | 59 % | 47 % | -7 % | 0 % |
| Mathematics | 38 % | 40 % | 42 % | 44 % | 9 % | 10 % |
| Interdisciplinary Nat Sciences | 65 % | 61 % | 67 % | 62 % | 4 % | 2 % |
| Biomedicine | 52 % | 48 % | 53 % | 50 % | 2 % | 4 % |
| Pharmacology & Toxicology | 77 % | 46 % | 76 % | 49 % | -1 % | 6 % |
| Clinical Sciences | 43 % | 43 % | 49 % | 45 % | 13 % | 5 % |
| Social Medicine and Epidemiology | 47 % | 41 % | 54 % | 46 % | 13 % | 11 % |
| Psychology | 24 % | 38 % | 33 % | 41 % | 39 % | 7 % |
| Economics | 17 % | 37 % | 12 % | 28 % | -27 % | -24 % |
| Political Science | 38 % | 34 % | 32 % | 29 % | -16 % | -14 % |
| Interdisciplinary Soc Sciences | 21 % | 29 % | 35 % | 32 % | 64 % | 9 % |
| Engineering Sciences | 57 % | 60 % | 51 % | 65 % | -10 % | 9 % |
| **All publications** | **58 %** | **49 %** | **59 %** | **53 %** | **3 %** | **7 %** |

Source: NCR Norway/NIFU/Thomson Reuters. PIs' publications from 2001-2010 are included.

## Co-publications with other applicants

Successful applicants have relatively more publications that have been co-authored with other applicants than the unsuccessful applicants have. This is shown in Table 2.17 and can be seen as an indication of a higher degree of centrality in the networks of researchers that apply for this type of funding. The shares of publications that are co-authored with other applicants are 34 per cent for the successful versus 23 per cent for the unsuccessful in the last five year period. The difference is larger than in the first period.

**Table 2.17 FRIPRO applicants (2005-2007): Publications with co-authorship with other FRIPRO applicants as share of total publications by research field and funded and rejected PI.**

| | 2001-2005 | | 2006-2010 | | Change | |
|---|---|---|---|---|---|---|
| **Subfield** | **Funded PI** | **Rejected PI** | **Funded PI** | **Rejected PI** | **Funded PI** | **Rejected PI** |
| Basic biosciences | 33 % | 28 % | 36 % | 29 % | 11 % | 5 % |
| Biology | 27 % | 24 % | 29 % | 25 % | 6 % | 3 % |
| Physics | 31 % | 28 % | 51 % | 42 % | 62 % | 48 % |
| Geosciences | 25 % | 26 % | 27 % | 25 % | 9 % | -3 % |
| Informatics | 10 % | 31 % | 15 % | 34 % | 58 % | 10 % |
| Chemistry | 19 % | 22 % | 27 % | 28 % | 42 % | 24 % |
| Mathematics | 5 % | 26 % | 10 % | 19 % | 110 % | -26 % |
| Interdisciplinary Nat Sciences | 24 % | 26 % | 24 % | 24 % | 1 % | -7 % |
| Biomedicine | 45 % | 40 % | 48 % | 39 % | 7 % | -4 % |
| Pharmacology & Toxicology | 23 % | 36 % | 56 % | 42 % | 142 % | 16 % |
| Clinical Sciences | 38 % | 31 % | 37 % | 25 % | -1 % | -19 % |
| Social Medicine and Epidemiology | 26 % | 24 % | 27 % | 21 % | 7 % | -10 % |
| Psychology | 22 % | 13 % | 31 % | 10 % | 38 % | -18 % |
| Economics | 17 % | 17 % | 5 % | 12 % | -68 % | -31 % |
| Political Science | 0 % | 19 % | 9 % | 16 % | 0 % | -18 % |
| Interdisciplinary Soc Sciences | 7 % | 25 % | 6 % | 7 % | -14 % | -73 % |
| Engineering Sciences | 12 % | 29 % | 16 % | 41 % | 29 % | 40 % |
| **All publications** | **30 %** | **23 %** | **34 %** | **23 %** | **14 %** | **-1 %** |

Source: NCR Norway/NIFU/Thomson Reuters. PIs' publications from 2001-2010 are included.

## Age, productivity and citation impact

We now return to the two main performance indicators used in the bibliometric analysis – productivity and citation impact – to investigate differences among age cohorts. Among the PIs that could be covered in the bibliometric analysis, the age at the time of the application is on average between 45 and 46 years. We divided the PIs in two cohorts: younger than 46 and 46 or older. A few PIs that have applied more than one time may appear in both cohorts. A few PIs are left out because information about age was not available.

Since the differences we find in the analysis of age cohorts are consistent over time, separate values are not shown for the first and second half of the ten year period studied.

Table 2.18 shows that the number of publications per PI in the ten year period 2001-2010 is almost twice as high in the older cohort as in the younger cohort. There is a clear difference in productivity between successful and unsuccessful applicants in the older cohort – just as we found in the overall analysis independently of age. This difference is smaller, but still recognizable, among the younger applicants.

**Table 2.18 FRIPRO applicants (2005-2007): Number of publications per PI 2001-2010, funded and rejected applications by age cohort.**

| | # Applicants | | Articles per PI | | | Total number of articles | |
|---|---|---|---|---|---|---|---|
| Cohort | Funded | Rejected | Funded | Rejected | Difference | Funded | Rejected |
| Younger than 46 | 125 | 439 | 20.3 | 16.2 | 25% | 2541 | 7112 |
| 46 or older | 127 | 409 | 48.7 | 30.4 | 60% | 6186 | 12421 |

Source: NCR Norway/NIFU/Thomson Reuters. PIs' publications from 2001-2010 are included.

Results that differ more from the overall analysis can be seen in Table 2.19, showing the citation impact of the two age cohorts. In the younger cohort, there is an even clearer difference between successful and unsuccessful applicants with regard to citation impact, while the picture is more contradictory in the older cohort. Here, the successful applicants are somewhat less cited when compared to the average in the journals they publish, but slightly more cited when compared to the average in the field of research, indicating that they publish in high impact journals, but that they are not significantly more cited than the unsuccessful applicants in their cohort. It is the young successful applicants that stand out with a clearly higher citation impact than the other groups by both indicators.

**Table 2.19 FRIPRO applicants (2005-2007): Journal-normalized and field-normalized relative citation rates 2001-2009 by age cohort and funded and rejected PI.**

| | #Articles | | Jnl rel cit | | Fld rel cit | |
|---|---|---|---|---|---|---|
| Cohort | Funded PI | Rejected PI | Funded PI | Rejected PI | Funded PI | Rejected PI |
| Younger than 46 | 2015 | 5615 | 1.18 | 1.13 | 1.43 | 1.30 |
| 46 or older | 5301 | 10162 | 1.07 | 1.12 | 1.39 | 1.33 |

Source: NCR Norway/NIFU/Thomson Reuters. PIs' publications from 2001-2009 are included. Citation impact counted per article after the end of 2010.

## Project type, productivity and citation impact

Applicants for individual scholarships have less publications per PIs than applicants for research projects, as seen in Table 2.20. There is a clear difference in productivity between successful and unsuccessful applicants for both types of funding, and the difference is the same for both types.

**Table 2.20 FRIPRO applicants (2005-2007): Number of publications per PI 2001-2010, funded and rejected applications by project type.**

| | # Applicants | | Articles per PI | | | Total number of articles | |
|---|---|---|---|---|---|---|---|
| Project type | Funded | Rejected | Funded | Rejected | Difference | Funded | Rejected |
| Individual fellowship | 69 | 234 | 21.2 | 13.2 | 61% | 1464 | 3080 |
| Research project | 227 | 835 | 34.4 | 21.3 | 62% | 7815 | 17766 |

Source: NCR Norway/NIFU/Thomson Reuters. PIs' publications from 2001-2010 are included.

Among applicants for research projects, which are the larger group of PIs, the successful applicants have a clearly higher citation impact than the unsuccessful applicants, as seen in Table 2.21. The difference is larger than we found in the overall analysis, which is explained by the fact that we find exactly the opposite among applicants for individual fellowship: Here, the funded applicants have a significantly lower citation impact than the rejected, which is a surprising result within the overall relatively consistent picture of somewhat higher publication and citation performance for funded PIs.

**Table 2.21 FRIPRO applicants (2005-2007): Journal-normalized and field-normalized relative citation rates 2001-2009 by project type and funded and rejected PI.**

| | #Articles | | Jnl rel cit | | Fld rel cit | |
|---|---|---|---|---|---|---|
| **Project type** | **Funded PI** | **Rejected PI** | **Funded PI** | **Rejected PI** | **Funded PI** | **Rejected PI** |
| Individual fellowship | 1283 | 2735 | 1.07 | 1.21 | 1.30 | 1.40 |
| Research project | 6833 | 15585 | 1.13 | 1.13 | 1.46 | 1.30 |

Source: NCR Norway/NIFU/Thomson Reuters. PIs' publications from 2001-2009 are included. Citation impact counted per article after the end of 2010.

Not shown in Table 2.21 is that the difference in citation impact between funded and rejected applicants for individual scholarship appears both before and after funding, and is larger in the second half of the ten year period: Unfunded applicants for individual scholarship are cited 54 per cent above the world average, while funded applicants are cited 39 per cent over the world average. The corresponding results for applicants for research projects in the second period are 29 per cent over the world average for rejected applicants and 47 per cent over the world average for funded applicants.

### Main findings of the bibliometric analysis

When measuring contribution to scientific quality in terms of international scientific publications, we find that FRIPRO support the researchers with the best track record, but FRIPRO funding does not seem to have measurable effect on the researchers' publication or citation rate. This observation is perhaps not unexpected, since the publications (and citations) of PIs in the natural and medical sciences, which dominate in our bibliometric data, will typically cover several projects and funding sources within smaller or larger networks of national and international scientific collaboration. Consequently, untraceable changes in publication and citation rates need not be interpreted as a sign of lacking importance or effect of the FRIPRO funding.[15]

On the other hand, there are some relatively stable differences between successful (PI+) and unsuccessful (PI-) applicants:

- There are a clearly higher number of publications per PI+ than by PI-. This difference is the same across age and project types, but older applicants have a higher number of publications than the younger, and applicants for individual scholarships have fewer publications than applicants for research projects.
- Publications by PI+ are somewhat more cited and appear in slightly more cited journals, but both groups of PIs are cited clearly above the average for publications from Norway in general. Young PI+ stand out with a clearly higher citation impact than the other groups. Applicants for individual scholarships are an exception in the general picture. Here, the PI+ have clearly lower citation impact than the PI-.
- Publications by PI+ exhibit a higher degree of international collaboration, also compared to publications from Norway in general.
- Publications by PI+ exhibit a higher degree of collaboration with other applicants.

## 2.4 Survey replies and interviews

In the survey, FRIPRO applicants were asked to indicate the number of scientific publications resulting from the projects, as well as comparing the characteristics of their FRIPRO projects with their other research projects. These data elaborate the findings in the bibliometric analysis.

### Outcome of funded vs. rejected applications

On average, the successful applicants report 8.6 scientific articles and 0.5 books resulting from their FRIPRO project. The average number of publications from individual fellowships is 3.6 articles and 0.3 books. The average number of publications from the research projects is 10.3 articles and 0.6 books.

[15] Moreover, the present study is based on descriptive statistics alone. More refined statistical methods for impact analysis might yield more comprehensive results.

The larger the project (measured by the amount applied for), the more publications. Projects for NOK 10 million or more report 24.4 articles, whereas projects below NOK 1 million report 4.3 articles (table below).

Compared with Danish data, scientific production per project for DFF funded projects is similar to that for FRIPRO, but the relations between the amount of funding and the number of publications differs[16]. The average number of peer-reviewed articles for DFF funded projects over the period 2004-2007 was 7.4, compared to 10.3 for FRIPRO funded projects. In comparison with the results by project size in Table 2.22, the average number of articles per project is higher for DFF among smaller projects (5.9 articles for projects under 1 million NOK, 9.6 articles for 1 to 2.5 million) and lower for larger projects (6.7 articles for 2.5 to 5 million, 6.9 articles for 5 to 10 million and 5.2 articles for 10 million or more).

Table 2.22 also includes publications from projects without FRIPRO funding. These figures are less reliable, as many of the respondents left the question open – they did not think it relevant or were unable to identify which of their applications related to the project they had applied for 5-7 years earlier. As 'unanswered' counts as zero in the calculations, average numbers of publications from non-funded projects are low. When only including active replies in the calculations, the figures for non-funded projects are substantially higher. Also figures for funded projects increase if we only include the entered numbers in the calculations, see note to the table.

**Table 2.22 Scientific publications resulting from FRIPRO applications 2005-2007, survey replies. Average per funded and not funded projects and project size and type.**

| | Applications funded by FRIPRO | | | Applications not funded by FRIPRO | | |
|---|---|---|---|---|---|---|
| **Project type/Amount applied for (MNOK)** | Average *articles per project | Average **books per project | N applications | Average articles per project | Average books per project | N applications |
| Individual fellowship | 3.6 | 0.3 | 85 | 1.0 | 0.1 | 267 |
| Research project | 10.3 | 0.6 | 240 | 2.4 | 0.1 | 920 |
| up to 1 mill | 4.3 | 0.3 | 15 | 1.7 | 0.1 | 35 |
| 1 to 2.4 mill | 4.6 | 0.3 | 83 | 2.1 | 0.1 | 277 |
| 2.5 to 4.9 mill | 8.0 | 0.5 | 127 | 1.8 | 0.1 | 418 |
| 5 to 9.9 mill | 11.5 | 0.5 | 87 | 2.3 | 0.1 | 417 |
| 10 mill and more | 24.4 | 1.8 | 13 | 3.6 | 0.2 | 40 |
| **Total** | **8.6** | **0.5** | **325** | **2.1** | **0.1** | **1187** |

Source: Survey to FRIPRO applicants 2005-2007. N=1512. All respondents are included in the calculations, when number of publications is not filled in the amount is set to 0. When only including the active replies when calculating averages (not setting 'no reply' to zero), the results are substantially higher, especially for the non-funded applications: average number of articles from funded projects is 10.3 and 6.8 from non-funded projects.
The question in full: 'Please indicate the number of peer-reviewed scientific publications which are a direct result of the project. Include both those authored by you and those authored by other project group members. Publications that were mainly funded by other sources should not be included. PhD theses should not be included, but separately published papers by those working on PhDs which also are expected to be/are part of a thesis should be included.'
*The questionnaire asked for: 'Number of articles/book chapters (peer reviewed and published)'.
** The questionnaire asked for: 'Number of books/monographs (peer reviewed and published)'.

The number of publications varies somewhat between research areas (table below). Compared to other fields, the result for the medical sciences is substantially lower for funded projects, and substantially higher for non-funded projects. On average the funded medical science projects have resulted in 4.8 articles and the non-funded in 3.6 articles. This deviation is due to one respondent reporting 200 articles from a project not funded by FRIPRO.[17]

[16] Based on DFF applications for the period 2004-2007. Data available only for funded applications. Note that results presented here for DFF are based only on research projects while the for FRIPRO in Table 2.22 are for research projects, postdocs and PhDs. Exchange rate used for calculations: 1 NOK = 0.9 DKK.
[17] 10 respondents reported more than 50 articles from their project. Of these, three projects where not funded by FRIPRO.

**Table 2.23 Scientific publications resulting from FRIPRO applications 2005-2007, survey replies. Average per funded and not funded projects and project size and type.**

| | Applications funded by FRIPRO | | | Applications not funded by FRIPRO | | |
|---|---|---|---|---|---|---|
| **Research area** | Average *articles per project | Average books per project | N applications | Average articles per project | Average books per project | N applications |
| Humanities | 10.0 | 0.9 | 50 | 2.4 | 0.2 | 219 |
| Natural sciences | 10.3 | 0.5 | 126 | 1.6 | 0.1 | 395 |
| Medical sciences | *4.8 | 0.2 | 94 | *3.6 | 0.1 | 315 |
| Social sciences | 10.2 | 0.7 | 49 | 0.9 | 0.1 | 215 |
| Engineering | 4.8 | 0.0 | 6 | 0.6 | 0.0 | 39 |
| Agriculture and fishery | - | - | 0 | 0.5 | 0.0 | 4 |
| **Total** | **8.6** | **0.5** | **325** | **2.1** | **0.1** | **1187** |

Source: Survey to FRIPRO applicants 2005-2007. All respondents are included in the calculations, when number of publications is not filled in, the amount is to 0. See notes to previous table.
*When only the including the amounts entered by respondents for calculating averages (not setting no reply to zero), the result for medical sciences is an average of 6.0 articles from funded projects and 7.9 articles from non-funded projects.

Funding sources and publications were key topics in the interview with FRIPRO applicants. When questioned on how FRIPRO had contributed to their publications, most of the informants had trouble linking FRIPRO funding to specific publications. There appeared to be several reasons for this, firstly most of their research received funding from multiple sources and since publications are often the result of a longer period of research some informants were able to identify large numbers of publications resulting from research which had received some FRIPRO funding. There were few informants who could link specific publications to FRIPRO funding. The following quotations give an idea of how some of the informants viewed this relationship between funding and publications:

- *'We had three FRIPRO projects at that time and the people financed by FRIPRO contributed to 70 per cent of the publications from these projects'*
- *'It is difficult to separate FRIPRO funding from other NFR funding. I usually distinguish between NFR funding and other types of funding'*
- *'There is a lot of overlap between people and funding sources, we look at this more in relation to research themes, so it can be difficult to match publications and funding sources'*
- *'All of my publications are based on work I did as a postdoc and that postdoc position was funded by FRIPRO'*

The other reason given for the difficulty linking publications to funding was that the principle investigators, whom we spoke to were not always listed as authors of the publications, however they stated that the project had produced publications. These publications without the principle investigators name would not have been picked up in our bibliometric analysis.

## FRIPRO project characteristics in comparison to other projects

A substantial proportion of the applicants report that their FRIPRO projects are more oriented towards basic research, have higher scientific quality and provide more new scientific results, than their other projects. Very few report that their other projects score higher than the FRIPRO on these characteristics. On all issues, the majority answers that there is no difference between their FRIPRO project and their other project, or that they cannot tell the difference (table below).

**Table 2.24 Applicants' comparisons of FRIPRO with their other projects.**

| Please compare the nature of your most recent FRIPRO project with your other R&D projects (forsknings- og utviklingsprosjekter) and indicate which projects: | The FRIPRO project | No difference | My other projects | Cannot say/NA | N |
|---|---|---|---|---|---|
| a) are most strategically important to your organisation? | 32.4 | 32.8 | 12.2 | 22.6 | 482 |
| b) are most oriented towards basic research? | 44.7 | 30.8 | 5.2 | 19.3 | 481 |
| c) provide most new scientific results? | 34.6 | 39.0 | 6.9 | 19.6 | 480 |
| d) are most scientifically/technologically risky? | 22.4 | 42.1 | 9.6 | 25.9 | 478 |
| e) have the highest scientific quality? | 27.8 | 47.4 | 5.2 | 19.6 | 479 |
| f) are most long-term? | 26.3 | 37.4 | 16.9 | 19.4 | 479 |
| g) are most multidisciplinary? | 16.7 | 43.7 | 18.0 | 21.5 | 478 |
| h) are most internationally oriented? | 23.7 | 47.0 | 10.7 | 18.7 | 477 |

Source: Survey to FRIPRO applicants 2005-2007. Only applicants who indicated that FRIPRO had funded their research in the period 2005 to 2010 were posed this question.

The most significant difference reported concerns basic research. As much as 45 per cent of the respondents consider their FRIPRO project to be more oriented towards basic research than their other projects, whereas only 5 per cent say the opposite. The only characteristic where FRIPRO score (slightly) lower than other projects, is multidisciplinary. 17 per cent of the applicants consider their FRIPRO project to be more multidisciplinary than their other projects, whereas 18 per cent consider their other projects to be more multidisciplinary than their FRIPRO project. This is quite the opposite to how Norwegian researchers consider the characteristics of projects funded by the EU framework programme. The same question was posed in a survey to Norwegian participants in FP6. Here multidisciplinary came out as the highest scoring characteristic and basic research as the lowest (Godø et al. 2009:95).

When splitting results by funded and non-funded projects, some interesting differences are found. There is a major difference in reported multidisciplinary. 24 per cent of funded applicants, but only 9 per cent of non-funded applicants, characterise their FRIPRO projects as more multidisciplinary than their other projects (Table 7.3, in Appendix 2). This may indicate that those who submit applications for projects which are more multidisciplinary than their ordinary research have a higher chance of obtaining FRIPRO funds than those who submit applications for projects which are less multidisciplinary than their ordinary research. This explanation would be in line with the general aim of FRIPRO to contribute to scientific renewal (see Chapter 1), and is further corroborated by how the applicants characterise the risk-level and international orientation of the projects. 28 per cent of funded applicants and 17 per cent of non-funded applicants characterise their FRIPRO projects as more scientifically risky than their other projects. Moreover, 31 per cent of funded applicants, and 16 per cent of non-funded applicants characterise their FRIPRO projects as more internationally oriented than their other projects (Table 7.3, in Appendix 2).[18]

Notably, the FRIPRO projects also score highly on the strategic importance for the applicant's organisation (35 per cent of successful applicants and 29 per cent of the unsuccessful score the FRIPRO project higher than their other projects, Table 7.3, in Appendix 2). The result is highest within the humanities where 49 per cent of successful applicants and 43 per cent of the unsuccessful score the FRIPRO project higher than their other projects (no table).

[18] Some of the difference is a consequence of a higher proportion of non-funded applicants answering 'cannot cay/not applicable', but there is also a higher proportion of non-funded applicants answering that their *other* projects are more internationally orientated and more scientifically risky (see Table 7.3 in Appendix 2).

# 3 Added value, research structure and strategic focus

What is the added value of the FRIPRO scheme for the research environments? In this chapter we look at applicants' perception of FRIPRO's impact on their research activities and international collaboration, FRIPRO's objectives compared to the objectives of the researchers, and FRIPRO's role at the universities and the independent research institutes respectively.

## 3.1 Added value: Scientific results and international collaboration

We find considerable support in the survey material that the applicants generally have high ambitions for their proposed project to the FRIPRO scheme. Nearly half of the respondents agreed with the statement *'I had higher ambitions for this project than for my research funded by my own institution'* (item a in Table 3.1). Given the high ambitions, we may also expect that the projects have a reasonably high impact.

The applicants' valuation of the FRIPRO scheme was addressed along several dimensions in a battery of questions targeting the impact of their project. The studied dimensions include impacts for the researcher: impact on research career (item b in Table 3.1) and skills in research management (item d). Moreover, impacts on collaboration and how research is performed are studied: international cooperation (item l), new groups (item k), larger collaborative projects (item i) and change in the way of doing research more generally (item j). Impacts on the institutions/departments are studied in terms of impact on the department's reputation (item e), on the department's ability to prioritise research areas (item g) and opportunities for attracting research talents (item f). Finally, importance for science and society are studied in terms of unexpected results of great importance to the research field (item c), importance for future research/innovation activities (item h) and the project's contribution to innovation (item m) and to solving social challenges (item n).

This battery of questions was only posed to applicants who received funding from FRIPRO or implemented the project with other funding (around 700). We find a moderate level of indifferent answers to these questions (10 to 23 per cent answer 'Don't know').

**Table 3.1 What impact does the FRIPRO scheme have on the structure and strategic focus of the research communities? Per cent.**

| | Fully agree | Partly agree | Neither Agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| a) I had *higher ambitions* for this project than for my research funded by my own institution | 32.8 | 15.8 | 27.1 | 2.1 | 9.0 | 13.2 | 711 |
| b) The project had a positive impact on my *research career* (e.g. new research position/promotion based on research resulting from the project) | 35.8 | 20.2 | 19.8 | 3.7 | 7.4 | 13.1 | 702 |
| c) The project led to some *unexpected results* of great importance to my research field | 33.3 | 34.6 | 16.9 | 1.1 | 2.7 | 11.4 | 700 |
| d) My research and innovation *management skills* have been significantly improved as a result of the project | 25.6 | 30.6 | 25.9 | 3.4 | 3.0 | 11.5 | 696 |
| e) The project has improved my *department's reputation* in Norwegian and international research communities | 22.2 | 32.4 | 22.3 | 2.4 | 3.0 | 17.6 | 698 |
| f) As a result of the project, my department has better opportunities for *attracting research talents* in my field of research | 15.8 | 27.3 | 27.9 | 4.2 | 5.3 | 19.5 | 696 |
| g) As a result of the project funding, my department is more able to *prioritise new research areas* | 6.1 | 17.2 | 35.8 | 8.0 | 10.5 | 22.4 | 687 |
| h) Through the project new research areas of significant *importance for our future research*/innovation activities have been explored | 30.9 | 34.7 | 15.0 | 2.5 | 3.5 | 13.4 | 686 |
| i) The project has changed my research activities towards *larger collaborative projects* | 16.8 | 29.8 | 27.6 | 7.2 | 7.8 | 10.8 | 695 |
| j) The project has changed my *way of doing research* | 7.8 | 24.0 | 35.8 | 9.1 | 12.7 | 10.5 | 692 |
| k) A *new research group* was established as a result of the project | 16.1 | 20.9 | 21.2 | 5.2 | 25.5 | 11.0 | 689 |
| l) Long term *international cooperation* links have been considerably enhanced as a result of the project | 34.8 | 26.6 | 17.9 | 4.2 | 6.8 | 9.8 | 693 |
| m) The project has led to or contributed to *innovation* (improved products, processes or organisational methods) | 12.5 | 16.9 | 26.5 | 4.9 | 20.4 | 18.8 | 687 |
| n) The project has contributed to solving *social challenges* (samfunnsutfordringer) | 6.2 | 14.5 | 25.3 | 4.4 | 26.7 | 22.9 | 689 |

Source: Survey to FRIPRO applicants 2005-2007. The questions were posed only for projects funded by FRIPRO or implemented with other resources.

In general, the PIs' responses indicate positive but sober valuation of the shorter and longer term impacts of the projects (Table 3.1). Six of the items measured prevail with particular or low impact. Firstly, unexpected results (item c), importance for future research/innovation activities (item h), and international cooperation (item l) are accentuated by large parts of the respondents. As much as 68 per cent fully or partly agree that 'The project led to some unexpected results of great importance to my research field' (item c). 66 per cent fully or partly agree that 'Through the project new research areas of significant importance for our future research/innovation activities have been explored' (item h). 61 per cent fully or partly agree that long-term international cooperation links have been considerably enhanced as a result of the project (item l). These three items also show the lowest level of indifferent answers (don't know/neither-nor).

Contrary to this, the lowest level of impact is reported on the department's ability to prioritise research areas (item g), new groups (item k) and solving social challenges (item n). For the statement 'As a result of the project funding, my department is more able to *prioritise new research areas'* (item g), we find a minor positive balance of opinion (by 5 percentage points) in this question (excluding the indifferent answers). Furthermore, only 21 per cent of the respondents report a positive contribution for *solving social challenges* (item n) and here we find a *negative* balance of opinion of 10 percentage points. A total of 31 per cent of the respondents reject that there has been a positive impact of the project on social challenges. This is not surprising, as societal impacts of projects with a basic/less applied nature, cannot be expected and is hardly measurable 1-5 years upon completion. Moreover, the replies regarding new groups (item k) and the department's ability to prioritise research areas (item g) indicate a low to moderate potential for the FRIPRO schemes relating to changing group structure and strategic focus of the research communities in the time perspective covered by this survey. It appears e.g. that the establishment of a new research group is not usually a result of the project.

The respondents' evaluation of the more individually oriented results and short-term outcomes is generally positively oriented: The potential for positive *career development* (item b) seems rather strong for the successful FRIPRO applicants. When comparing the replies of the successful and unsuccessful FRIPRO applicants, we find a considerable difference in the report of positive research career effects (Table 3.2). In this way, FRIPRO funding may give rise to a Matthew effect for the successful applicants boosting their academic career more than for the rejected FRIPRO-applicants who received other funding for their proposal. More analysis and register data on career development over a longer period of time would be needed to investigate this hypothesis further.

**Table 3.2 b) The project had a positive impact on my research career (e.g. new research position/promotion based on research resulting from the project)**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 45.1 | 24.2 | 17.7 | 3.2 | 6.1 | 3.6 | 277 |
| No funding | 29.6 | 17.6 | 21.2 | 4.0 | 8.2 | 19.3 | 425 |
| Total | 35.8 | 20.2 | 19.8 | 3.7 | 7.4 | 13.1 | 702 |

Source: Survey to FRIPRO applicants 2005-2007. The question was posed only for projects funded by FRIPRO or implemented with other resources.

We also find that a majority of 78 per cent of the successful applicants reported that the project led to some unexpected results of great importance to their research field, compared to 62 per cent of the unsuccessful applicants (Table 3.3):

**Table 3.3 c) The project led to some unexpected results of great importance to my research field. Per cent by funded and not funded FRIPRO applicants**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 37.2 | 40.4 | 19.1 | 1.4 | 1.1 | 0.7 | 277 |
| No funding | 30.7 | 30.7 | 15.4 | 0.9 | 3.8 | 18.4 | 423 |
| Total | 33.3 | 34.6 | 16.9 | 1.1 | 2.7 | 11.4 | 700 |

Source: Survey to FRIPRO applicants 2005-2007. The question was posed only for projects funded by FRIPRO or implemented with other resources.

The distribution of responses from successful and unsuccessful FRIPRO applicants for the other items, are found in Appendix 2, Table 7.4 to Table 7.17). The largest differences between the projects funded by FRIPRO and rejected applications implemented with other resources are listed below (percentage point difference between successful and unsuccessful applicants who fully/partly agree):

- International cooperation: 24 percentage point difference (item l, 'Long-term international cooperation links have been considerably enhanced as a result of the project').
- *Importance for future research/innovation*: 22 percentage point difference (item h, 'Through the project new research areas of significant importance for our future research/innovation activities have been explored').
- *Management skills*: 17 percentage point difference (item d, 'My research and innovation management skills have been significantly improved as a result of the project')
- *Department's reputation*: 16 percentage point difference (item e, 'The project has improved my department's reputation in Norwegian and international research communities')
- *Larger collaborative projects:* 14 percentage point difference (item i, 'The project has changed my research activities towards larger collaborative projects').
- *Attracting talents*: 10 percentage point difference (item f, 'As a result of the project, my department has better opportunities for attracting research talents in my field of research').

A number of the items in Table 3.1 have also been covered in the evaluation of Danish research project funding (DFF funding), particularly items b, c, e, f and g. Responses concerning research career (item b) and unexpected results of great importance to the research field (item c) does not differ much for the two studies. 60 per cent of funded applicants surveyed in the DFF evaluation fully or partially agreed that the funded project had a positive impact on their research career, compared to 69 per cent for funded FRIPRO applicants. For DFF, around two thirds fully or partially agreed that their funded project led to some unexpected results of great importance to their field, compared to 78 per cent for FRIPRO. Results differ slightly concerning impacts for their research department as a whole (items e, f and g). Around 10 per cent fewer FRIPRO funded applicants viewed that the funded project had improved their department's reputation, ability to attract new talent or to prioritize new research areas.

Five of the statements in Table 3.1 are similar to those in a survey to Norwegian participants in the EU Framework Programme (FP6, see Godø et al. 2009, page 11). Comparing the replies from the funded FRIPRO applicants and the FP6 participants, we find higher impact for FRIPRO on all issues except the contribution to innovation. A larger proportion fully agrees that their research and innovation management skills have been significantly improved as a result of the project (31 versus 18 per cent, item d). A larger proportion fully agrees that new research areas of significant importance for future research/innovation activities have been explored (39 versus 22 per cent, item h). A slightly larger proportion fully agrees that the project has changed their way of doing research (9 versus 5 per cent, item j). Even for long term international collaboration, we find a slightly higher percentage of FRIPRO PIs who fully agree (46 versus 44 per cent, item l). Whereas as a smaller proportion fully agree that the project has led to innovation (13 versus 22 per cent, item m).

### International cooperation

As indicated above, the PIs of implemented projects (that is, projects funded by FRIPRO or implemented with other resources) most often agree that 'Long term international cooperation links have been considerably enhanced as a result of the project' (item l, 61 per cent of fully or partly agree). Table 3.4 shows that successful applicants far more often than the unsuccessful applicants, consider that international cooperation is improved (24 percentage point difference, as noted above). Hence, FRIPRO funding seems to have a considerable effect on international cooperation.

**Table 3.4 I) Long term international cooperation links have been considerably enhanced as a result of the project. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 45.5 | 30.3 | 15.2 | 3.2 | 4.3 | 1.4 | 277 |
| No funding | 27.6 | 24.0 | 19.7 | 4.8 | 8.4 | 15.4 | 416 |
| Total | 34.8 | 26.6 | 17.9 | 4.2 | 6.8 | 9.8 | 693 |

Source: Survey to FRIPRO applicants 2005-2007. The question was posed only for projects funded by FRIPRO or implemented with other resources.

Contrasting with data from the bibliometric analysis (Chapter 2.3), the successful applicants have a higher degree of international co-authorship than unsuccessful applicants, but FRIPRO funding does not seem to have measurable effect on the degree of co-authorship. Those already having good international cooperation links more often obtain FRIPRO funding, but measured in international co-authorship the FRIPRO funding does not seem to imply any change in international cooperation. Still, successful applicants more often than unsuccessful applicants, reply that their long term international cooperation has been considerably enhanced as a result of the project.

The portfolio analysis furthermore corroborates that applications with international partners have a substantially higher success rate than applications without international partners (31 versus 12 per cent, Table 3.5). However, only 135 of the applications are registered with international partners in the RCN database (112 research projects, 22 postdocs and 1 PhD fellowship). The registration of international partners is likely to be incomplete, and probably more complete for funded than for rejected applications. Hence, the result is not very robust; it gives an *indication* that applications with international partners have a higher success rate. On the other hand, both the review criteria announced in the call for proposals, and interviews with informants involved in the review process, corroborates that international collaboration implies a higher chance of funding.

**Table 3.5 Success rates FRIPRO applications 2005-2010, by international collaboration. Per cent.**

| Registered international collaboration | Rejected | Funded | Not reviewed | N |
|---|---|---|---|---|
| No | 83.4 | 11.8 | 4.8 | 5699 |
| Yes | 67.4 | 31.1 | 1.5 | 135 |
| Total | 83.0 | 12.3 | 4.7 | 5834 |

Source: RCN application data. Table includes applications for research projects, post doc projects and PhD project (5834 of the 6064 applications in the period).
*Include withdrawn ('trukket') and declined ('avvist') applications, as well other cases of non-reviewed applications ('lukket').

Summing up, those already having international cooperation links more often obtain FRIPRO funding, but data on FRIPRO's effect on international research cooperation are not conclusive. The survey data indicate that FRIPRO funding has a considerable effect on international research cooperation, whereas this finding is not corroborated by data on international co-authorship.

## 3.2 FRIPRO objectives, institutional strategies and distribution of roles

### FRIPRO's objectives as perceived by the research community

In the survey, applicants were asked to rank various objectives for the FRIPRO scheme, as well as objectives of their research (Table 3.6 and Table 3.7). High scientific quality prevails as the most important objective both for FRIPRO and for the applicants: 89 per cent rate it as highly important for FRIPRO and 89 per cent rate it as always important in their research. Scientific renewal comes out as the second highest ranked objective (56 per cent rate it as highly important for FRIPRO and 51 per cent rate it as always important in their research), whereas developing basic theory and methods rank

third both for FRIPRO and for the applicants. Hence, there seems to be high coherence between applicants' perceptions of FRIPRO's objectives and their own objectives. It should be noted that both researcher recruitment and international collaboration are stated objectives in the FRIPRO calls, though some applicants consider these objectives to be less important for FRIPRO.

**Table 3.6 Applicants' perceptions of the FRIPRO objectives. Per cent.**

| To what extent do you consider the following to be important purposes of the FRIPRO scheme? | Highly important | Somewhat important | Less important | No opinion | N |
|---|---|---|---|---|---|
| High scientific quality | 88.7 | 7.7 | 1.0 | 2.6 | 933 |
| Develop basic theory and methods | 50.0 | 34.8 | 9.9 | 5.3 | 928 |
| Scientific renewal | 55.9 | 30.1 | 7.8 | 6.2 | 926 |
| Research recruitment | 38.1 | 43.9 | 13.5 | 4.5 | 929 |
| International cooperation | 44.7 | 39.6 | 12.4 | 3.3 | 929 |
| Interdisciplinary collaboration | 23.2 | 41.1 | 30.2 | 5.5 | 930 |
| Other objectives | 15.4 | 6.3 | 5.8 | 72.4 | 583 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 3.7 Applicants' accounts of the objectives of their research. Per cent.**

| How would you describe your own research/ research group's objectives in terms of the following dimensions: | Always an important objective | Often an important objective | Sometimes an important objective | Never an important objective | N |
|---|---|---|---|---|---|
| High scientific quality | 89.4 | 10.2 | 0.3 | 0.1 | 930 |
| Develop basic theory and methods | 40.6 | 40.0 | 18.5 | 0.9 | 928 |
| Scientific renewal | 50.8 | 38.1 | 9.2 | 2.0 | 922 |
| Research recruitment | 38.1 | 39.2 | 20.6 | 2.1 | 926 |
| International cooperation | 51.1 | 35.3 | 12.1 | 1.5 | 926 |
| Interdisciplinary collaboration | 30.1 | 35.7 | 29.0 | 5.3 | 925 |

Source: Survey to FRIPRO applicants 2005-2007.

In general, the replies from successful and unsuccessful applicants are much the same. On most objectives, a somewhat higher proportion of the successful than the unsuccessful applicants answer 'Highly important' for FRIPRO, whereas the unsuccessful applicants somewhat more often reply 'No opinion' (Table 3.8 below and Table 7.25 in Appendix 2).

In Table 3.8 the proportions who reply 'Highly important' for FRIPRO and the proportions who reply 'Always important' in own research, are compared for successful and unsuccessful applicants. In most cases the differences concur or they are marginal. Both groups of applicants consider interdisciplinary and international collaboration to be somewhat more important in their own research than in FRIPRO (5 to 8 percentage points difference), and both groups consider basic theory and methods to be somewhat more important in FRIPRO than in their own research (9 to 10 percentage points difference). For scientific renewal, on the other hand, some differences appear. Whereas successful applicants rate scientific renewal as equally important for FRIFPRO and for themselves, among the unsuccessful applicants there is a somewhat higher proportion that rate scientific renewal as highly important for FRIFPRO than they do for themselves (7 percentage points difference).

**Table 3.8 Highly important objectives of FRIPRO versus own research.**

| Objective | Result of application | FRIPRO % Highly important | Own objectives % Always important | Difference FRIPRO - own |
|---|---|---|---|---|
| High scientific quality | Funding | 95.7 | 94.6 | 1.1 |
| | No funding | 86.1 | 87.3 | -1.2 |
| | Total | 88.7 | 89.4 | -0.7 |
| Develop basic theory and methods | Funding | 55.0 | 44.6 | 10.4 |
| | No funding | 48.1 | 39.1 | 9.0 |
| | Total | 50.0 | 40.6 | 9.4 |
| Scientific renewal | Funding | 59.9 | 59.2 | 0.7 |
| | No funding | 54.4 | 47.5 | 6.9 |
| | Total | 55.9 | 50.8 | 5.1 |
| Research recruitment | Funding | 44.6 | 40.3 | 4.3 |
| | No funding | 35.6 | 37.3 | -1.7 |
| | Total | 38.1 | 38.1 | 0.0 |
| International cooperation | Funding | 47.3 | 54.9 | -7.6 |
| | No funding | 43.7 | 49.6 | -5.9 |
| | Total | 44.7 | 51.1 | -6.4 |
| Interdisciplinary collaboration | Funding | 20.1 | 27.2 | -7.1 |
| | No funding | 24.4 | 31.1 | -6.7 |
| | Total | 23.2 | 30.1 | -6.9 |

Source: Survey to FRIPRO applicants 2005-2007. Number of respondents varies across questions, from 922 to 933, see tables above.

With the exception of the humanities, results are much the same across research areas. Respondents in the humanities more often rate scientific renewal, researcher recruitment, international cooperation and interdisciplinary collaboration as 'highly important' for FRIPRO and also more often report that these objectives always are important in their research.[19]

## Institutional strategies and the distribution of roles between the Research Council and the universities

The data show a clear niche of the FRIPRO scheme. The large majority of the funds go to the universities; university colleges and specialised university institutions have a marginal role in FRIPRO (Table 2.10). The scheme has a high standing in the Norwegian research community – as the only scheme funding independent research projects based on open calls and national competition. FRIPRO scores highly compared to other Norwegian schemes on prestige and on opportunities offered for doing unique/original research (Table 5.10). Moreover, a substantial proportion of the applicants consider that their FRIPRO projects are more oriented towards basic research, have higher scientific quality and provide more new scientific results, than their other projects (Table 2.24). Interviews with key informants at the research institutions confirm this picture of FRIPRO as a high ranking scheme mainly aimed at the universities. FRIPRO funding is highly appreciated also at the institutional level. The scheme suits the universities and is part of their strategies. Researchers are encouraged to apply for funds and information about calls is distributed. Though, one informant added that the unit had limited resources for helping younger, non-established researchers with the applications.

For the universities, the advantages and importance of FRIPRO are linked to their need for external funds and that FRIPRO is open to all research fields and topics. It is an open, general scheme which suits the different needs of the different research environments – e.g. external sources for basic research within an area with no other external funding, external funds for temporary positions. Informants report that there is a need for much more research funding than available at the university, and that FRIPRO is the most attractive Norwegian scheme.

[19] Humanities percentages for highly important / always important: Scientific renewal 67 per cent for FRIPRO and 64 per cent for themselves; researcher recruitment 50 per cent for FRIPRO and 46 per cent for themselves; international cooperation 59 per cent for FRIPRO and 62 per cent for themselves; interdisciplinary collaboration 31 per cent for FRIPRO and 40 per cent for themselves (no table).

Moreover, obtaining a good review from FRIPRO is perceived as a quality label and several institutions have economic incentives for FRIPRO applicants and follow up highly rated, but not funded, projects. Hence, to some extent university funds have been used for supporting unsuccessful FRIPRO applicants also before this was general policy (i.e. before 'Fellesløftet', see Chapter 1.1). Informants had diverse views on the balance between FRIPRO/independent project funding and the general university funds. In general, the open national competition for funds was appreciated. One informant considered that if more research funds were allocated directly to the universities, this would demand much effort and resources at the universities to distribute these funds to the best projects – and doubted the universities' abilities to do this. Another stated that they were used to competition and it was not evident that more general university funds and less to FRIPRO would imply any more resources to his/her department. Others were reluctant to increase the role of FRIPRO, stating that as a rule they were in favour of open national competition, but they had concerns about the universities' room for manoeuvring or FRIPRO's ability to review applications in their area. One considered that using more university funds to support FRIPRO projects ('Fellesløftet') would imply less room for research priorities at the university level, another that FRIPRO's review panels had limited expertise in the relevant research area and that this could be detrimental to small research environments.

### FRIPRO at independent research institutes

The Terms of Reference ask for an assessment of the role of the FRIPRO scheme in the independent research institute sector. As shown in Chapter 2, the universities account for 86 per cent of the FRIPRO funding and the institute sector account for 11 per cent (Table 2.10). However, there are significant differences between research areas. A large number of the applications from the institute sector are within the social sciences, and these applications also account for a large part of the total number of FRIPRO applications within the social sciences (349 applications from the independent research institutes versus 527 applications from the universities in the six-year period, Table 3.9). Hence, the research institutes have a substantial role in FRIPRO within the social sciences, but not within other areas. Table 3.9 moreover shows that in all research areas except engineering, FRIPRO applications from the universities have higher success rate than FRIPRO applications from the institutes.

**Table 3.9 Number of FRIPRO applications and success rates from the institute sector and the universities 2005-2010, by research area. Per cent.**

| | Institute sector | | Universities | |
|---|---|---|---|---|
| **Research area** | % Funded | N | % Funded | N |
| Humanities | 6.3 | 32 | 9.9 | 852 |
| Natural sciences | 9.1 | 276 | 16.6 | 1405 |
| Medical sciences | 8.0 | 138 | 12.4 | 1486 |
| Social sciences | 10.3 | 349 | 13.5 | 527 |
| Engineering research | 14.3 | 28 | 10.9 | 184 |
| Agriculture and fishery | 0.0 | 4 | 0.0 | 1 |
| **Total** | **9.4** | **827** | **13.3** | **4455** |

Source: RCN application data. Table includes applications for research projects, post doc projects and PhD project.

Studying survey replies from the institute respondents, we find – not surprisingly – that these respondents are less involved in researcher recruitment and developing basic theory and methods. 28 per cent of the respondents at the institutes and 42 per cent of the respondents at the universities report that researcher recruitment is always an important objective in their research group. 22 per cent of the respondents at the institutes and 44 per cent of the respondents at the universities report that developing basic theory and methods is always an important objective in their research.[20] At the same time respondents from institutes think these are important objectives of the FRIPRO schemes, and replies here are much the same regardless of sector. Presumably this implies that for the research institutes, FRIPRO funding is a distinct opportunity from their ordinary activity – that is, an opportunity

[20] Questions reported in Table 3.7, no table for figures split on sector.

to do more basic research and to obtain funding for researcher recruitment.[21] This is corroborated in the informant interviews. The institutes have very limited basic funds and few other options for funding basic research, postdocs or PhDs. In order to fulfil aims of doing some basic research – not only applied research – and have recruitment positions, extra funding is needed and some perceive FRIPRO as the only option for such funding.

## 3.3 Main findings

- When comparing survey replies for projects supported and rejected by FRIPRO, the added value of FRIPRO funding for scientific results and for career development seems generally good, whereas added value for the institution/department, not surprisingly, is lower. Still, the effects on the department's reputation seem considerable. Moreover, the survey data indicate that FRIPRO funding has a considerable effect on international research cooperation. Those who have obtained FRIPRO funds are much more likely to report that their long term international cooperation has been enhanced as a result of the project.
- There seems to be high coherence between applicants' perceptions of FRIPRO's objectives and their own objectives.
- Universities are the main target group for the scheme (receiving 86 per cent of the funding) and the scheme is also highly appreciated at the institutional level. Informants consider there to be a need for much more research funding than is available at universities, and FRIPRO is an open, general scheme which suits the different needs of the different research environments. Researchers are encouraged to apply for funds and information about calls is actively distributed at the universities.
- Informants had diverse views on the balance between FRIPRO/independent project funding and general university funds. In general, the open national competition for funds was appreciated. Some trusted their departments' ability to compete for FRIPRO funds more than competing for university funds, or doubted the universities' abilities to distribute funds to the best projects. Others were more in favour of institutional funds as they had concerns about the universities' room for manoeuver and priority setting, or they were unsure about FRIPRO's ability to cater for small/non mainstream research environments.
- FRIPRO seems especially important within the humanities, where there are few other external funding sources.
- The independent research institutes have a substantial role in FRIPRO within the social sciences, but not within other areas. The institute sector in total account for 11 per cent of the applications to FRIPRO.

[21] However, replies from institutes and universities are quite similar when asked to compare their FRIPRO project and their other projects according to basic research (survey question reported in Table 2.24). 43 per cent of the respondents from the institutes and 46 per cent from universities reply that their FRIPRO project is more oriented towards basic research than their other projects. 10 per cent of the respondents from the institutes and 5 per cent from universities reply that their other projects are more oriented towards basic research.

# 4 Recruitment and quota practice

In this chapter, we study the role of FRIPRO for the recruitment of researchers and the measures taken to recruit female post-doctoral candidates and PIs and post-doctoral candidates with professional education. The Terms of Reference ask about FRIPRO's impact on researcher recruitment and its significance for established versus younger researchers, as well as the impact of moderate quotas for the underrepresented gender and candidates with professional education in medicine, odontology and psychology.

## 4.1 Researcher recruitment and established vs. younger researchers

**Impact on researcher recruitment**

According to the data from the RCN, FRIPRO has funded 309 PhD doctoral fellowships and 437 postdocs in the 6-year period studied (including both individual fellowships and fellowships as part of researcher projects, Table 4.1). This is a moderate proportion of the overall number of doctoral degrees awarded in Norway in the period (in total 6043 degrees awarded). The numbers are still large enough to be important for the recruitment to research, especially in fields where there are few other funding options for research recruits.

Table 4.1 shows substantial differences between research areas. FRIPRO funds more research recruitment positions in the natural sciences than in other areas, and the figure is also high compared to the overall distribution of awarded doctoral degrees in Norway. The natural sciences account for close to half of the FRIPRO doctoral fellowships and postdocs, but only a quarter of the total number of degrees awarded in Norway. In the other research areas, FRIPRO funds a lower share of doctoral fellowships than the area's total proportion of awarded degrees. The exception is the humanities, where FRIPRO funds a slightly higher share of doctoral fellowships than the area's total proportion of awarded degrees (12 versus 11 per cent). The FRIPRO scheme seems least important within engineering research. With only 17 doctoral fellowships and 17 postdocs in the 6-year period, FRIPRO accounts for a marginal proportion of the recruitment of researchers within this area.

**Table 4.1 Recruited positions in funded FRIPRO projects in 2005-2010* and all doctoral degrees awarded in Norway, per cents by research area.**

| | All doctoral degrees awarded (Norway 2005-2010) | FRIPRO recruitment positions | | | |
|---|---|---|---|---|---|
| | | Doctoral fellowships | | Postdocs | |
| **Research area** | % | # | % | # | % |
| Humanities | 10.7 | 36 | 11.7 | 57 | 13.0 |
| Natural sciences | 25.8 | 138 | 44.7 | 210 | 48.1 |
| Medical sciences | 28.8 | 68 | 22.0 | 119 | 27.2 |
| Social sciences | 22.0 | 50 | 16.2 | 34 | 7.8 |
| Engineering | 12.7 | 17 | 5.5 | 17 | 3.9 |
| **N** | **6 043** | **309** | **100** | **437** | **100** |

Sources: FRIPRO application data provided by RCN and Doctoral Degree Statistics at www.nifu.no.
*As only some of the projects applied in 2010 (for start-up in 2011) had reported their recruit positions for the data set we received for the evaluations, data for 2010 are not complete.

According to informants, FRIPRO recruitments positions are especially important in research environments where there are few other funding options for PhD or postdoc fellows doing basic research (e.g. in the humanities and institute sector). In general, FRIPRO was perceived as the only national competitive funding source for basic independent research projects. There was said to be a need for more recruitment positions than those allocated directly to the universities, and the national competition for the FRIPRO recruitment positions were seen as positive for promoting high quality.

As shown in Chapter 5, many rejected FRIPRO applicants obtained other funding and rejected projects have also been implemented. Table 4.2 shows the number of reported PhDs and postdocs both in awarded and rejected projects. The 1215 rejected projects for which information is provided have in total resulted in 279 completed PhDs and 360 PhDs in progress. The 297 awarded projects have resulted in 144 completed PhDs and 142 PhDs still in progress. The average number of PhDs per project is clearly higher for awarded than rejected projects (0.48 versus 0.23 completed PhDs), but the difference is smaller than might be expected. The rejected applications have also resulted in many postdocs (149 completed and 139 still in progress). These results may be interpreted in different ways. Obviously, several of the research environments applying for FRIPRO projects have alternative funding sources for recruitment positions. Moreover, the FRIPRO application and review process may increase the likelihood for obtaining other funding. A large proportion of the applications obtain very high scores (see Chapter 6), and the result might be used to obtain alternative funding for the project. Hence, on the one hand, the results may indicate that the importance of FRIPRO for recruitment positions is moderate. On the other hand, they may indicate that the FRIPRO applications and review process has positive impact also for rejected applicants in terms of increasing the possibilities for other funding (in addition, several of the rejected applications are also resubmitted to FRIPRO and obtain funding on second try, see Table 5.5).

**Table 4.2 Number of PhD and candidates postdocs resulting from successful and non-successful FRIPRO applications 2005-2007, survey replies.**

| | | Number of candidates resulting from the project applied | | | |
|---|---|---|---|---|---|
| **Year of application** | **Result of FRIPRO applications** | Completed PhDs | PhDs in progress | Ended postdocs | Postdocs in progress |
| 2005 | Rejected | 80 | 95 | 42 | 24 |
| | Funded | 61 | 30 | 72 | 13 |
| | Total | 141 | 125 | 114 | 37 |
| 2006 | Rejected | 108 | 125 | 51 | 52 |
| | Funded | 48 | 47 | 67 | 12 |
| | Total | 156 | 172 | 118 | 64 |
| 2007 | Rejected | 91 | 140 | 56 | 63 |
| | Funded | 35 | 65 | 57 | 36 |
| | Total | 126 | 205 | 113 | 99 |
| Total sum | Rejected | 279 | 360 | 149 | 139 |
| | Funded | 144 | 142 | 196 | 61 |
| | Total | 423 | 502 | 345 | 200 |
| Average # candidates per application | Rejected | 0.23 | 0.30 | 0.12 | 0.11 |
| | Funded | 0.48 | 0.48 | 0.66 | 0.21 |
| | **Total** | **0.28** | **0.33** | **0.23** | **0.13** |

Source: Survey to FRIPRO applicants 2005-2007. N=1512 applications (1215 rejected and 297 awarded).

## The success of established versus younger applicants

Some informants expressed concern about the ability of younger researchers to compete against more established researchers in the prevalent situation with very high rejection rates. There was said to be a lack of opportunities for younger talents. However, in the analysis in Chapter 2 we saw that the younger applicants have a somewhat higher success rate than older applicants (Table 7.2, Appendix 2). In the table below we have calculated the average age of funded and rejected applicants by research area and type of application. We see that in all areas, the average age of successful fellowship applicants is lower than for the non-successful. Moreover, the average age of the PI of the research projects is the same for funded and rejected projects. Hence, at the overall level there should be no need for special measures to avoid that younger applicants are disfavoured. However, there are differences between research areas. For research projects in the humanities and social sciences, the average age of the successful applicants is lower than for the non-successful, whereas in the other fields the younger applicants are less successful. The reason may be a tradition in 'harder' disciplines to put more emphasis on the track record of the applicants when reviewing grant applications.

**Table 4.3 Average age of successful and non-successful FRIPRO projects 2005-2010, by research area.**

| | Research projects (Average age PI) | | Fellowships applicants* (Average age) | |
|---|---|---|---|---|
| **Research area** | Funded | Rejected | Funded | Rejected |
| Humanities | 48.4 | 50.8 | 34.7 | 37.7 |
| Natural sciences | 48.7 | 47.4 | 32.7 | 34.3 |
| Medical sciences | 49.0 | 48.7 | 35.7 | 38.3 |
| Social sciences | 47.1 | 49.2 | 35.0 | 39.0 |
| Engineering | 46.4 | 45.7 | 30.4 | 34.6 |
| Total average age | 48.5 | 48.5 | 34.3 | 37.1 |
| **N** | **453** | **2837** | **167** | **746** |

Source: RCN application data. The sample includes 4382 of 5834 applications in the period. For the remaining data on age are missing.

*Including applications for PhD and postdocs.

## Career impacts and opportunities to attract talents

In the survey applicants were asked both about the projects' impact on their research career, and importance for their department in terms of better opportunities for attracting research talents in the relevant field of research. A large number of the applicants report a positive impact on their research

career. Not surprisingly, the younger applicants and those obtaining funding most often report positive impacts. About half of the youngest applicants (those below 40) fully agree that the project has had positive impact on their research career (Table 4.4). These figures include both funded and rejected projects. Notably, significant impact is reported also among those who did not obtain FRIPRO funding. Of those below 40 years old, about 60 per cent of those funded by FRIPRO, and 40 per cent of those rejected/implemented with other resources, fully agree that the project has had positive career impacts.

**Table 4.4 FRIPRO applications' impact on research careers, survey replies by age and successful and non-successful applications. Per cent.**

| The project had a positive impact on my research career* | Up to 29 | 30-39 | 40-49 | 50-59 | 60 and above | Age unknown | Total | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Funded | Rejected |
| Fully agree | 53.8 | 49.4 | 36.7 | 27.4 | 17.9 | 6.7 | 45.1 | 29.6 |
| Partly agree | 0.0 | 18.3 | 20.8 | 21.2 | 28.6 | 6.7 | 24.2 | 17.6 |
| Neither agree nor disagree | 30.8 | 13.3 | 20.1 | 23.5 | 23.2 | 26.7 | 17.7 | 21.2 |
| Partly disagree | 0.0 | 1.1 | 3.9 | 6.1 | 3.6 | 6.7 | 3.2 | 4.0 |
| Fully disagree | 0.0 | 5.0 | 6.6 | 9.5 | 8.9 | 26.7 | 6.1 | 8.2 |
| Don't know | 15.4 | 12.8 | 12.0 | 12.3 | 17.9 | 26.7 | 3.6 | 19.3 |
| **N** | **13** | **180** | **259** | **179** | **56** | **15** | **277** | **425** |

Source: Survey to FRIPRO applicants 2005-2007.
*The question in full: 'To what extent do you agree with the following statements? Please answer for the specific project. The project had a positive impact on my research career (e.g. new research position/promotion based on research resulting from the project)'.

More impact on younger researchers goes along with more impact on female than male researchers (the average age of the women in the sample is 4 years lower than the average age of the men). Whereas 56 per cent of the funded women fully agree that the project has had positive impact on their career, 40 per cent of the men fully agree (similar figures for the non-funded are 43 per cent for women and 23 per cent for men, no table). As expected, the impact is also higher for those obtaining personal fellowships, than for the PIs of research projects (59 per cent of fellows and 41 per cent of PIs fully agree, no table).

There are also large differences across research fields. Researchers within the social sciences and humanities more often fully agree that the project has had positive career impacts. 70 per cent of funded social scientists fully agree and 62 per cent of those within the humanities. Similar figures for natural sciences are 36 per cent and 34 within the medical sciences (no table).

When asked whether the project has resulted in better opportunities for their department to attract research talents, the FRIPRO applicants are somewhat less positive. Moreover, the difference between funded and rejected project is smaller than for the question about their career. 18 per cent of the PIs of funded research projects and 17 per cent of those of rejected research projects fully agree that the project has led to better opportunities to attract research talents. Similar figures for the individual fellowships are somewhat lower. 12 per cent of the successful fellowship applicants and 9 per cent of the non-successful fully agree (Table 4.5). Lower figures for the fellows reflect that the question has the perspective of the department – and the seniors in charge – not the recruits themselves.

The difference between funded and rejected projects in reported opportunities for attracting research talents, varies between research areas. Somewhat surprisingly, in medical and natural sciences those who have *not* obtained FRIPRO funds more often fully agree that the project has led to better opportunities to attract research talents. 14 of unsuccessful and 11 per cent of the successful applicants fully agree within natural sciences, and 19 of unsuccessful and 15 per cent of the successful fully agree within the medical science.[22] An explanation of the many cases of lack of added

[22] In these figures, all applicants are included – both individual fellowships and research projects. No table.

value of funding on the opportunities to attract research talents, may be that the departments have alternative funding sources, and that one project grant alone is often not considered enough for obtaining better opportunities for attracting research talents. This is supported by the fact that most added value is found within the humanities, which is an area with little access to external funding. In the humanities, 28 per cent of funded PIs fully agree that opportunities for attracting research talents are improved, whereas only 12 per cent of non-successful PIs fully agree.[23]

**Table 4.5 FRIPRO applications' impact on opportunities for attracting research talents, survey replies by project type and successful and non-successful applications. Per cent.**

| As a result of the project, my department has better opportunities for attracting research talents | Individual fellowships | | | Research projects | | | Total all replies |
|---|---|---|---|---|---|---|---|
| | Funding | No funding | Total | Funding | No funding | Total | |
| Fully agree | 11.8 | 8.8 | 10.3 | 17.6 | 16.9 | 17.1 | 15.8 |
| Partly agree | 23.5 | 20.6 | 22.1 | 36.2 | 24.0 | 28.6 | 27.3 |
| Neither agree nor disagree | 30.9 | 26.5 | 28.7 | 31.4 | 25.4 | 27.7 | 27.9 |
| Partly disagree | 2.9 | 5.9 | 4.4 | 4.8 | 3.7 | 4.1 | 4.2 |
| Fully disagree | 5.9 | 8.8 | 7.4 | 3.8 | 5.4 | 4.8 | 5.3 |
| Don't know | 25.0 | 29.4 | 27.2 | 6.2 | 24.6 | 17.7 | 19.5 |
| **N** | **68** | **68** | **136** | **210** | **350** | **560** | **696** |

Source: Survey to FRIPRO applicants 2005-2007.
The question in full: 'To what extent do you agree with the following statements? Please answer for the specific project. As a result of the project, my department has better opportunities for attracting research talents in my field of research'.

## 4.2 Quotas in medicine, odontology and psychology

To enable the recruitment of candidates with a professional education in medicine, odontology and psychology to enter a research career, FRIPRO has throughout the studied period employed moderate quotas for these groups (for applications for individual postdoc fellowships). When the applications are assessed as equally good, the candidates with a professional education are given priority. According to the informants, there are very few postdoc applications from candidates with such education, and very seldom a case in which two postdoc applications are assessed as equally good so that the quota policy applies. Hence, the general impact of this policy for enabling the recruitment of candidates with a professional education to a research career cannot be anything other than marginal.

Whereas the involved review committees and RCN staff seem well informed and concerned about the issue – and appropriate routines ensure information and application of the quotas in the review process – the research institutions seem less well informed about the quota policy and how it works. Some had little insight into the problem of recruiting candidates with a professional education or were of the opinion that these candidates could apply for grant from other sources. A few thought that a large part of the resources was spent on medical research and did not think it fair that they should get priority over candidates from other fields, whereas others thought it was reasonable to apply moderate quotas. Consequently, there seems to be a need for better information about the quota policy – that it only applies for postdocs within medical research, and that there are very few cases in which the quota policy is relevant/applies.

## 4.3 Gender quotas

The FRIPRO scheme has applied moderate gender quotas for post-doctoral research fellowships since 2005 and for research projects since 2007. The proportion of female professors at Norwegian universities is low (21 per cent in 2010) and the purpose of the quota policy is to help female

[23] Both individual fellowships and research projects are included in the figures. No table.

researchers to qualify for professorships. When applications are assessed as equally good by the reviewers, and the applicants/PIs have different gender the underrepresented gender is given priority. As noted in Chapter 2, for the 6-year period in total male and female FRIPRO applicants have been quite similar in their overall success rates. The success of female applicants has increased during the period. For the research projects, the success rate was 5.9 percentage points higher for men than women in 2005, and 3.7 percentage points higher for women than men in 2010 (Table 4.6). This may be an effect of the quota policy. Informants involved in the review process report that the review committees are positive to the quota policy and have no problem implementing it. Several added that often female applicants top the ranking list and that a good proportion of 'female projects' are obtained without any quota policy. RCN facilitates the process by providing the committee with overview of applications by gender, and including gender statistics in the annual summary reports of the review process (report for the Division Board). Some informants commented that the overall gender distribution is very different across research fields and suggested that there might be a need for more differentiated use of gender quotas.

Notably, men and women success rates are more equal for FRIPRO than for Danish research project funding (DFF funding) – which does not apply gender quotas.[24] While success rates are very similar for male and female applicants for FRIPRO research projects (12.4 per cent and 11.6 per cent), rates for DFF applicants (for the period 2005-2009) are 5 percentage points higher for men at 22.2 per cent compared to 17.2 per cent for women.

The informants had different views on the extent and ways in which the information about the gender quotas encouraged more female researchers to be PI of applications for research projects. The data show that the proportion of female PIs of applications for research projects has increased during the period – from 25 per cent in 2005 to 34 per cent in 2010 (Table 4.6). Hence, the increased success rate of female applicants goes along with a higher proportion of applications from women.

**Table 4.6 Gender of PI of FRIPRO applications for research projects, per cent by year.**

| Gender of PI | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | Total |
|---|---|---|---|---|---|---|---|
| Per cent women applicants | 25.3 | 27.3 | 28.7 | 31.7 | 34.1 | 34.1 | 30.4 |
| Per cent men applicants | 74.7 | 72.5 | 71.3 | 68.2 | 65.7 | 65.9 | 69.5 |
| Per cent gender unknown | 0.0 | 0.2 | 0.0 | 0.1 | 0.2 | 0.0 | 0.1 |
| **N** | **724** | **663** | **663** | **755** | **828** | **787** | **4420** |
| *Success rate female compared to male PIs** | -5.9 | -1.9 | 2.8 | 0.4 | -1.6 | 3.7 | -0.8 |

Source: RCN application data. Only research projects are included.
*Percentage points; male success rate subtracted from female success rate. When including all applications, not only the research projects, the success rate is 2.1 percentage points higher for males in 2005, 1.1 higher in 2006, and 0.8 higher in 2009. The success rate was 1.1 percentage points higher for females in 2007, 1.2 higher in 2008 and 2.7 higher in 2010.

Table 4.7 shows that the gender success rate of postdoc applications varies between years. For some years male applicants are more successful, and in other years female applicants are more successful. Overall for the 6-year period, the success rate is close to equal for men and women (13.6 per cent for female applicants, 13.9 for male applicants). In total, 162 individual postdoc fellowships were awarded, of these 48 per cent went to women.

[24] However, DFF has other measures encouraging female researchers. Recent DFF funding measures (over the period 1998-2008) with a specific focus on female researchers include FREJA, Postdoctoral grants for women, Female Steno Fellowships, Young female research managers, Female Skou Fellowships, Young Women Scientists (including Women in Nature and Technology) and Female Research Council Professorships. The FREJA project sought to increase women researchers' opportunities to find a foothold and establish independent research fields, and funded 16 research projects over the period 1998-2002. A number of women who have sought postdoctoral, Steno and Skou Fellowship, have received what are known respectively as postdoctoral scholarships for women, Female Steno Fellowship and Women Skou scholarships. In these cases, the existing instruments have been used for implementing an earmarked pool of funds for women. Additional postdoctoral grants were targeted to women through the Young Women Scientists program. Female Heads of Research was an initiative in 2008 through which the DFF supported 10 research projects aimed at women scientists with the goal of gaining experience in the management of research, which is required for qualification for appointment as a professor.

Compared to success rates for applications for post doc fellowships from the Danish DFF, FRIFPRO success rates are substantially lower, as is also the case for research projects (see above). The average success rate for DFF post doc fellowships was 33 per cent for 2001-2008. DFF success rates are fairly similar for men (35 per cent) and women (31 per cent), though men submit more applications and the majority of post docs were awarded to men (61 per cent) over this period. This can be contrasted with FRIPRO, where the shares of post docs awarded to male and female applicants are more equal.

**Table 4.7 Success rates FRIPRO postdoc applications 2005-2010, by year and gender.**

| | Women | | Men | |
|---|---|---|---|---|
| **Year** | # Appl | % Succ. | # Appl | % Succ. |
| 2005 | 98 | 17.3 | 136 | 21.3 |
| 2006 | 88 | 15.9 | 97 | 13.4 |
| 2007 | 94 | 10.6 | 92 | 10.9 |
| 2008 | 100 | 12.0 | 98 | 7.1 |
| 2009 | 89 | 13.5 | 79 | 12.7 |
| 2010 | 105 | 12.4 | 102 | 14.7 |
| **Total** | **574** | **13.6** | **604** | **13.9** |

Source: RCN application data. Table includes (individual) applications for post doc projects. Postdocs in applications for research projects are not included.

Table 4.8 shows the gender distribution of postdoc positions in the funded FRIPRO research projects. 39 per cent of these 322 postdoc positions are held by women, that is, the female proportion is lower for these positions (39 per cent) than for those awarded to individual applicants (48 per cent). As candidates for the postdocs positions are not named in the research projects (anonymous candidates), and there are far more postdoc fellows in these projects than there are individual postdoc fellows, RCN has no influence on the gender distribution of a large proportion of the postdocs fellowships funded.

Notably, in the research projects the proportion of women is higher for PhD fellows (47 per cent) than for Postdoc fellows (39 per cent).

**Table 4.8 Reported PhD postdoc fellows in FRIPRO research projects 2005-2009, by year and gender.**

| **Year** (of | PhDs fellows | | | Postdoc fellows | | |
|---|---|---|---|---|---|---|
| application) | # female | # male | % women | # female | # male | % women |
| 2005 | 34 | 46 | 42.5 | 38 | 53 | 41.8 |
| 2006 | 37 | 35 | 51.4 | 25 | 47 | 34.7 |
| 2007 | 26 | 22 | 54.2 | 24 | 38 | 38.7 |
| 2008 | 28 | 34 | 45.2 | 26 | 40 | 39.4 |
| 2009 | 14 | 18 | 43.8 | 13 | 18 | 41.9 |
| **Total** | **139** | **155** | **47.3** | **126** | **196** | **39.1** |

Source: RCN application data. Only postdocs fellows within research projects are included.
*As only some of the projects applied in 2010 (for start-up in 2011) had reported their recruit positions for the data set we received for the evaluations, figures for 2010 are not include in the table.

## 4.4 Main findings

- FRIPRO has funded a moderate proportion of the overall number of doctoral degrees awarded in Norway in the period studied. These numbers are still large enough to be important for the recruitment to research, especially in fields where there are few other funding options for research recruitment.
- For research projects in the humanities and social sciences, the average age of the successful applicants is lower than for the non-successful, whereas in the medical and natural sciences and in engineering, the younger applicants are less successful.

- The moderate quotas applied by FRIPRO to help female researchers to qualify for senior positions seem to be effective. Both the proportion of applications from female researchers and the success rate of female applicants have increased during the 6-year period studied.
- The effects of moderate quotas employed for postdoc applicants with a professional education in medicine, odontology and psychology, seem marginal. There are very few postdoc applications from candidates with such education, and very seldom a case in which two postdoc applications are assessed as equally good so that the quota policy applies.

# 5 Interfaces with other funding schemes

What is the role of the FRIPRO scheme in comparison to other funding schemes? In this chapter we look at applicants' perception of the niche of the FRIPRO scheme and its complementarity with other funding schemes, how they rate the significance of FRIPRO in comparison with other funding schemes, to what extent funding from FRIPRO also generates funding from other sources, and to what extent rejected FRIPRO applications obtain funding from other sources.

## 5.1 Complementarity with other funding schemes

A large proportion of the applicants find that FRIPRO is complementary to other RCN schemes in terms of supporting research for which there is no alternative funding source. In the survey 66 per cent of the applicants fully or partly agree that 'FRIPRO support research for which there is no other RCN funding source'. A somewhat lower proportion of the applicants consider that FRIPRO is complementary to other RCN schemes in terms of the kinds of activities funded (51 per cent fully or partly agree), and even fewer find that FRIPRO is complementary in terms of the size of the grants (28 per cent fully or partly agree, Table 5.1).

**Table 5.1 Complementarity and task division between the FRIPRO scheme and other RCN research support schemes. Per cent.**

| How do you regard the complementarity and task division between the FRIPRO scheme and other* RCN research support schemes? | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Cannot say | N |
|---|---|---|---|---|---|---|---|
| FRIPRO support research for which there is no other RCN funding source | 36.9 | 29.4 | 9.2 | 6.1 | 3.8 | 14.6 | 918 |
| FRIPRO is complementary to other RCN schemes in terms of the kinds of activities funded | 19.8 | 31.0 | 17.3 | 9.5 | 4.2 | 18.2 | 919 |
| FRIPRO is complementary to other RCN schemes in terms of the size of the grants | 8.2 | 20.2 | 23.7 | 12.0 | 8.7 | 27.2 | 918 |

Source: Survey to FRIPRO applicants 2005-2007.
* e.g. research programmes, infrastructural and institutional measures (centre schemes, funding for scientific equipment/databases, basic funding to research institutes).

When splitting results by research areas and funded and non-funded applicants, some differences appear (Table 5.2). Funded applicants more often than rejected applicants fully agree that FRIPRO is complementary to other RCN schemes (for all three issues asked). Whereas 49 per cent of funded applicants fully agree that FRIPRO supports research for which there is no other RCN funding source,

only 32 per cent of the non-funded applicants fully agree to this. This indicates that successful applicants often consider that no other RCN scheme could support their FRIPRO projects, whereas unsuccessful applicants more often consider that the projects they find listed in the FRIPRO project archive could be funded by other RCN schemes. The difference is particularly large within the humanities and the social sciences where 26 to 28 percentage points more of the funded than the non-funded applicants fully agree that FRIPRO supports research for which there is no other RCN funding source. In the medical sciences, we find the lowest proposition of applicants fully agreeing that FRIPRO supports research for which there is no other RCN funding source, and also the smallest difference between the funded and non-funded applicants.[25]

**Table 5.2 Complementarity and task division between the FRIPRO scheme and other RCN research support schemes, by research area and result of application. Per cent.**

| How do you regard the complementarity and task division between the FRIPRO scheme and other* RCN research support schemes? | **Funded by FRIPRO** | % fully agree | | | | | |
|---|---|---|---|---|---|---|---|
| | | Humani-ties | Natural sciences | Medical sciences | Social sciences | Engin-eering | **Total** |
| FRIPRO support research for which there is no other RCN funding source | Yes | 60.5 | 52.1 | 38.6 | 52.4 | 20.0 | 49.2 |
| | No | 34.2 | 33.3 | 33.5 | 24.0 | 42.1 | 32.2 |
| FRIPRO is complementary to other RCN schemes in terms of the kinds of activities funded | Yes | 30.2 | 33.3 | 18.3 | 32.6 | 0.0 | 27.9 |
| | No | 18.5 | 20.6 | 11.0 | 14.4 | 36.8 | 16.6 |
| FRIPRO is complementary to other RCN schemes in terms of the size of the grants | Yes | 23.3 | 12.6 | 11.4 | 16.3 | 0.0 | 14.5 |
| | No | 5.0 | 4.9 | 6.3 | 4.8 | 21.1 | 5.7 |
| N (number of respondents differs between the three questions) | Yes | 43 | 95-96 | 70-71 | 42-3 | 5 | 256-258 |
| | No | 119-120 | 204-205 | 190-191 | 125 | 19 | 661-662 |

Source: Survey to FRIPRO applicants 2005-2007.
*The questionnaire specified this: e.g. research programmes, infrastructural and institutional measures (centre schemes, funding for scientific equipment/databases, basic funding to research institutes).

A selection of citations from applicants' free text comments to the questions on complementarity illustrates some specific concerns regarding FRIPRO's role, ranging from the size of grants to concentration of resources, and the overall purpose and size of the scheme:

- *I don't think complementarity is a relevant issue here. As I understand it (and want it), FRIPRO should fund any high-quality science, whether or not it has short-term societal relevance and whether or not the topic may fit in one or another other funding scheme. Hence, much of what is applied to FRIPRO could also be applied to other sources and everything asked for to other sources should be allowed to compete for FRIPRO funding (if good enough). FRIPRO is the only home in the RCN system for novel ideas stemming from curiosity rather than societal needs.*
- *What needs to be improved, is complementarity in terms of size: a mouse does not appear complementary to an elephant.*
- *I considered the FRIPRO as a means for funding where there are no other programmes covering the same scientific disciplines and topics. The size of the grants makes it less attractive than many of the larger programs (whenever the sci. topic in question is covered by other programs).*
- *FRIPRO is the only source for conducting unbiased free basic research, but it has not lived up to this expectation due to highly limited funding resources.*
- *With the present regime, primarily groups that participate in CoE or CoI receive the basic funding and networking that is required to attract FRIPRO funding. As such, FRIPRO largely acts as complementary funding of centre activities. Early success in the CoE/CoI race thus gets reinforced by the present FRI* mechanism, with rigidity and conservatism as a partial result.*
- *FRIPRO is rather restricted in terms of scale. Often excellent research can be accomplished for modest funds which are "too small" to be part of current FRIPRO schemes. In addition, there should be room for*

[25] Within engineering the difference between funded and non-funded applicants is the opposite of what we find within the other areas, but the number of respondents in this group (24) is too small to yield robust results.

*small but high risk pilot and exploratory seed projects. There are no other reliable sources of funding for this in Norway as opposed to other countries/systems – limiting innovation and new ideas.*

The successful applicants were furthermore asked if they were aware of other Norwegian or international funding sources which would have been relevant for their FRIPRO project. Concerning Norwegian alternatives, differences between research areas are much the same as for other RCN funding sources reported above. A low proportion of awardees within the humanities (19 per cent) and a high proportion of awardees within the medical sciences (66) report alternative Norwegian funding sources for their project. The proportion with Norwegian alternatives is low also within the natural sciences (21 per cent), and somewhat higher within the social sciences (41 per cent). For international funding sources, differences across research are much smaller. In total, 56 per cent report that they are aware of international funding sources relevant for their project: varying from 51 per cent within the humanities to 66 per cent within the medical sciences (not including engineering research where there are only 5 respondents with successful applications).

**Table 5.3 Funded applicants' alternative Norwegian and international funding sources. Per cent by research areas.**

| Are you aware of other funding sources which would have been relevant for the project you applied to FRIPRO for? | | Humanities | Natural sciences | Medical sciences | Social sciences | Engineering | Total |
|---|---|---|---|---|---|---|---|
| Other Norwegian funding sources | Yes | 19.0 | 21.2 | 66.2 | 40.5 | 40.0 | 36.6 |
| | No | 81.0 | 78.8 | 33.8 | 59.5 | 60.0 | 63.4 |
| | N | 42 | 113 | 77 | 42 | 5 | 279 |
| International funding sources | Yes | 51.2 | 52.6 | 65.8 | 58.5 | 20.0 | 56.4 |
| | No | 48.8 | 47.4 | 34.2 | 41.5 | 80.0 | 43.6 |
| | N | 43 | 114 | 79 | 41 | 5 | 282 |

Source: Survey to FRIPRO applicants 2005-2007. Only successful applicants were posed this question.

A higher proportion of those who applied for research projects (39 per cent) than those who applied for fellowships (29 per cent) report that they are aware of alternative Norwegian funding sources for the project. For international funding sources, the proportion that is aware of an alternative is the same for research projects and fellowships (56 per cent, no table).

## The fate of rejected applications

Whereas the successful applicants were asked if they were aware of alternative funding sources for their projects, the unsuccessful applicants were asked if the application was resubmitted. Of the 864 unsuccessful applicants who replied to this question, 52 per cent said they had resubmitted the application; the remainder said that they had not (48 per cent). The proportion of resubmitted applications varies from 62 per cent in the medical sciences to 45 per cent in the natural sciences (not including the four respondents within agriculture and fishery).

Active researchers in charge of groups submitting many applications may have difficulties recalling if a specific, 4-6 year old application was resubmitted. Hence, the result might be biased.[26] Most likely those resubmitting the application, and especially those obtaining other funding, will more often be able to answer the question than those who did not resubmit.

[26] 'Don't remember' was no alternative, the question was not compulsory. In total, 1215 non-successful applicants accessed the questionnaire, but a large part of them only replied a few questions.

**Table 5.4 Was your original FRIPRO application later (revised and) resubmitted to FRIPRO or submitted to other funding schemes? Per cent by research area.**

| Research area | Resubmitted | Not resubmitted | N |
|---|---|---|---|
| Humanities | 56.1 | 43.9 | 155 |
| Agriculture and fishery | 25.0 | 75.0 | 4 |
| Natural sciences | 45.1 | 54.9 | 295 |
| Medical sciences | 61.9 | 38.1 | 236 |
| Social sciences | 46.4 | 53.6 | 151 |
| Engineering | 52.2 | 47.8 | 23 |
| **Total** | **52.0** | **48.0** | **864** |

Source: Survey to FRIPRO applicants 2005-2007. Only non-successful applicants were posed this question.

The applications were resubmitted to many different funding schemes, but most often to FRIPRO. In total, 284 of the 449 resubmitted applications were to FRIPRO (63 per cent). Of these, 26 per cent were successful when resubmitted to FRIPRO (Table 5.5). Many applications were also resubmitted to other RCN schemes. 83 were submitted to large-scale programmes – of which more than half was successful. The applicants also report that several of the applications rejected by FRIPRO later on obtained funding from high ranking funding schemes. 25 are reported submitted to the various RCN centre schemes (SFF, SFI or FME) – and 4 them successfully. Moreover, 29 are reported submitted to ERC and 8 of them successfully. As noted above, the results might be biased. Those obtaining funding, will more often be able to recall that the application was resubmitted. Hence, numbers of successful applications are better indications of success than percentages of successful applications/success rates.

**Table 5.5 To what scheme(s) was your application later submitted/resubmitted to and what was the outcome? Per cent.**

| Funding scheme | Submitted, but no funding | Submitted and received funding | Submitted and still pending | N |
|---|---|---|---|---|
| RCN FRIPRO-grants (Fri prosjektstøtte) | 73.9 | 25.7 | 0.4 | 284 |
| RCN Large-scale programmes (Store programmer) | 42.2 | 54.2 | 3.6 | 83 |
| RCN Basic research programmes (Grunnforskningsprogrammer) | 64.3 | 35.7 | 0.0 | 42 |
| RCN User-directed innovation programmes (Brukerstyrte programmer) | 54.2 | 41.7 | 4.2 | 24 |
| RCN Centre of Excellence (SFF) or Centre of Research-based innovation (SFI) or FME | 56.0 | 16.0 | 28.0 | 25 |
| RCN Policy-oriented programmes (Handlingsrettede programmer) | 56.0 | 40.0 | 4.0 | 25 |
| RCN Networking measures (courses, conferences, events, awards, network agreements, collaborative measures or international networking measures) | 33.3 | 61.1 | 5.6 | 18 |
| FP 7 Ideas (European Research Council) | 55.2 | 27.6 | 17.2 | 29 |
| Other parts of FP7 or FP 6 | 17.6 | 67.6 | 14.7 | 34 |
| Other | 19.5 | 77.9 | 2.7 | 113 |
| **Total (sum of resubmittances)*** | **53.6** | **42.4** | **4.0** | **677** |

Source: Survey to FRIPRO applicants 2005-2007. Only non-successful applicants that had indicated that they had resubmitted the application were posed this question.
*In total 449 respondents reported to have resubmitted the application, and of these 417 replied to the question reported in this table. When the replies for the alternative schemes sum up to 677 (resubmitted) applications, this indicates that many of them have been resubmitted to several schemes. As each resubmittance is counted separately, the table shows a higher per cent of unsuccessful resubmittances (54 per cent) than Table 5.6 (39 per cent).

Table 5.6 shows the result of resubmitted applications by research areas. In total, 39 per cent of the applications resulted in no funding, 21 per cent in the same amount as the original FRIPRO

application, 16 per cent resulted in more, and 21 per cent resulted in less funding than the original application. The applications within humanities were the less successful (52 per cent obtained no funding) and those within the medical sciences the most successful (26 per cent obtained no funding).

**Table 5.6 Please indicate the total funding resulting from resubmitting the application. Per cent by research area.**

| Research area | No funding | Less funding than in original application | Same or similar to the original application | More funding than in original application | Don't remember | *N |
|---|---|---|---|---|---|---|
| Humanities | 52.3 | 15.1 | 19.8 | 9.3 | 3.5 | 86 |
| Natural sciences | 43.8 | 25.0 | 15.6 | 14.8 | 0.8 | 128 |
| Medical sciences | 26.4 | 19.3 | 29.3 | 19.3 | 5.7 | 140 |
| Social sciences | 38.7 | 24.2 | 14.5 | 17.7 | 4.8 | 62 |
| Engineering, agriculture and fishery | 45.5 | 9.1 | 36.4 | 9.1 | 0.0 | 11 |
| **Total** | **39.1** | **20.6** | **21.3** | **15.5** | **3.5** | **427** |

Source: Survey to FRIPRO applicants 2005-2007. Only non-successful applicants that had indicated that they had resubmitted the application were posed this question.
Alternatives in full: Received no funding; Received the same or simular to the sum requested in the original FRIPRO application; Received more funding than the sum in the original FRIPRO application; Received less funding than the sum in the original FRIPRO application; Don't remember.
*427, of the 449 who reported to have resubmitted the application, replied to the question.

Unsuccessful applicants who indicated that they had not obtained other funding were asked if the projects had been implemented without external funding. 46 per cent of the relevant 588 respondents replied that the project was fully or partly implemented, 54 per cent that it was not implemented (Table 5.7).

**Table 5.7 Was the project you proposed implemented/performed without external funding? Per cent by research area.**

| Research area | No | Partly | Yes | N |
|---|---|---|---|---|
| Humanities | 51.8 | 33.3 | 14.9 | 114 |
| Natural sciences | 57.7 | 31.5 | 10.8 | 213 |
| Medical sciences | 39.7 | 45.0 | 15.3 | 131 |
| Social sciences | 63.6 | 26.4 | 10.0 | 110 |
| Engineering, agriculture and fishery | 60.0 | 30.0 | 10.0 | 20 |
| **Total** | **53.7** | **33.8** | **12.4** | **588** |

Source: Survey to FRIPRO applicants 2005-2007. Only non-successful applicants that had indicated that they had not obtained other funding were posed this question.

## Does FRIPRO support research for which there is no other funding source?

Summing up results in this section we find that:

- A large proportion of applicants agree that FRIPRO funds research for which there is no other RCN funding source (49 per cent of successful applicants and 32 per cent of unsuccessful applicants fully agree).
- A substantial part of successful applicants (37 per cent) report that they are aware of other Norwegian funding sources relevant for their project, and a majority (56 per cent) are aware of relevant international funding sources for the project. Humanities appear as the area with least access to alternative funding, and medical science as the area with best access to alternative funding.
- A large number of rejected projects have been implemented: Of the 864 rejected applications for which we have information, 449 were resubmitted to FRIPRO or submitted to other schemes, and more than half of these obtained funding (about 60 per cent). Notably, 284 of them were resubmitted to FRIPRO and of these 73 were funded (26 per cent). Moreover, 272 applicants report that their project was (fully or partly) implemented without any external funding. In sum, the

majority of rejected applications seem to be implemented, either with FRIPRO funds, funds from other schemes or without external funding.

- In conclusion, FRIPRO is seen as filling a separate role by funding research for which there is no other RCN scheme, and FRIPRO is the most used scheme for resubmitting FRIPRO applications. Still, many applicants have local, national or international alternative funding sources for their FRIPRO projects, and a majority of rejected applications seem to be implemented.

## 5.2 FRIPRO as a door opener for other funding

Those who had obtained FRIPRO projects were asked to indicate the proportion of the total project costs that were covered by FRIPRO, by other external funds, and by internal/institutional funds. On average, the FRIPRO funding covered 90 per cent of the individual fellowships and 67 per cent of the research projects. Overall, the FRIPRO funding covered 73 per cent, institutional (internal) funds covered 15 per cent and other external funding covered 12 per cent (Table 5.8). The proportion of other external funds was substantially higher within the medical sciences (26 per cent), than within the humanities (2 per cent), natural sciences (7 per cent) or social sciences (9 per cent).

**Table 5.8 Please estimate what proportion of the total project cost was covered by FRIPRO funding, by other external funds, and by internal/institutional funds (if you are not able to give an estimate, leave blank). Average percentages by research area and project type.**

| Research area/ Project type | FRIPRO funding | Other external funds | Internal/ institutional funds | N |
|---|---|---|---|---|
| Humanities | 86.5 | 2.3 | 11.2 | 35 |
| Natural sciences | 77.4 | 7.3 | 15.3 | 94 |
| Medical sciences | 57.6 | 25.6 | 16.6 | 72 |
| Social sciences | 75.3 | 8.6 | 15.2 | 41 |
| Engineering | 84.0 | 0.0 | 16.0 | 5 |
| Fellowship | 90.2 | 5.0 | 4.7 | 61 |
| Research project | 67.0 | 14.3 | 18.5 | 186 |
| **Total** | **72.7** | **12.0** | **15.1** | **247** |

Source: Survey to FRIPRO applicants 2005-2007. Only successful applicants were posed this question.

A substantial proportion of those obtaining FRIPRO grants, reports that the FRIPRO funding enabled them to successfully compete for funding from other external sources. This may include funding obtained for the FRIPRO project as well as for other research projects. On a scale from 1 to 5, 35 per cent of the awardees rate their success in competing for other Norwegian funding 4 or 5, and 25 per cent rate their success in competing for international funding 4 or 5. Compared to average size FRIPRO projects, the smaller projects (below NOK 1 million) seem to have somewhat less importance when competing for other funding (Norwegian or international). The largest projects (above NOK 10 million) seem to have good effect when competing for Norwegian funding, but less when competing for international funding (Table 5.9).

**Table 5.9 To what extent did the FRIPRO funding enable you to successfully compete for funding from other external sources? Replies by size of the FRIPRO project. Per cent.**

| FRIPRO application amount | 5 To a high degree | 4 | 3 | 2 | 1 Not at all | Cannot say | N |
|---|---|---|---|---|---|---|---|
| | | | *Resulted in additional Norwegian funding* | | | | |
| up to 1 mill NOK | 7.7 | 15.4 | 7.7 | 0.0 | 30.8 | 38.5 | 13 |
| 1 to 2.4 mill NOK | 14.5 | 17.4 | 8.7 | 8.7 | 21.7 | 29.0 | 69 |
| 2.5 to 4.9 mill NOK | 14.9 | 24.6 | 8.8 | 3.5 | 22.8 | 25.4 | 114 |
| 5 to 9.9 mill NOK | 16.2 | 16.2 | 13.5 | 6.8 | 20.3 | 27.0 | 74 |
| 10 mill NOK and more | 18.2 | 18.2 | 9.1 | 9.1 | 27.3 | 18.2 | 11 |
| **Total** | **14.9** | **19.9** | **10.0** | **5.7** | **22.4** | **27.0** | **281** |
| | | | *Resulted in additional international funding* | | | | |
| up to 1 mill NOK | 0.0 | 0.0 | 7.1 | 14.3 | 42.9 | 35.7 | 14 |
| 1 to 2.4 mill NOK | 13.0 | 14.5 | 11.6 | 4.3 | 26.1 | 30.4 | 69 |
| 2.5 to 4.9 mill NOK | 12.3 | 15.8 | 9.6 | 1.8 | 32.5 | 28.1 | 114 |
| 5 to 9.9 mill NOK | 12.3 | 11.0 | 9.6 | 2.7 | 27.4 | 37.0 | 73 |
| 10 mill NOK and more | 0.0 | 9.1 | 27.3 | 0.0 | 27.3 | 36.4 | 11 |
| **Total** | **11.4** | **13.2** | **10.7** | **3.2** | **29.9** | **31.7** | **281** |

Source: Survey to FRIPRO applicants 2005-2007. Only successful applicants were posed this question.

## 5.3 Significance compared to other schemes

In the survey, applicants were asked to rate FRIPRO compared to other Norwegian and international funding sources – in particular ERC grants. Results are shown in Table 5.10 and 5.11. As expected, FRIPRO scores far better compared to Norwegian than to international/ERC sources. Both for the national and the international comparison, a large proportion of the applicants reply that FRIPRO is equally good or they say they cannot tell the difference. The tables still give interesting information when comparing the results on the different items rated. When compared with other Norwegian funding sources, FRIPRO scores best on the opportunities offered for doing unique/original research and on the impact on the prestige and career of the awarded investigators. On opportunities for doing unique/original research, 35 per cent of the respondents rate FRIPRO higher than Norwegian alternatives, 15 per cent rate FRIPRO lower. On impact on prestige and career, 28 per cent of the respondents rate FRIPRO higher than Norwegian alternatives, only 5 per cent rate FRIPRO lower. On the other hand, FRIPRO scores somewhat lower than Norwegian alternatives on support for new projects without requiring preliminary research, opportunities offered for doing interdisciplinary research, amount of funding, and support for young scientists (Table 5.12 shows the difference between 'Better' and 'Poorer' for all items).

There are notable differences in the replies from successful unsuccessful applicants. Those obtaining funding from FRIPRO more often reply that FRIPRO is better than other Norwegian funding sources and less often answer 'poorer' or 'cannot say'. According to these respondents, FRIPRO is better than other Norwegian funding sources on all issues in the table, also on support for new projects without requiring preliminary research, opportunities offered for doing interdisciplinary research, amount of funding, and support for young scientists (Table 7.30 to Table 7.42 in Appendix 2).

**Table 5.10 FRIPRO compared to other Norwegian funding sources, applicants' survey replies. Per cent.**

| Comparing FRIPRO with alternative Norwegian funding sources, is FRIPRO poorer, about the same or better concerning: | Better | About the same | Poorer | Cannot say | N |
|---|---|---|---|---|---|
| Opportunities offered for doing unique/original research? | 35.1 | 25.1 | 15.2 | 24.6 | 895 |
| Opportunities offered for addressing high-risk topics? | 19.8 | 27.2 | 15.1 | 37.9 | 889 |
| Support for new projects without requiring preliminary research? | 8.5 | 31.4 | 21.8 | 38.2 | 889 |
| Opportunities offered for doing interdisciplinary research? | 9.0 | 39.6 | 14.7 | 36.7 | 890 |
| Opportunities offered for broadening your field of expertise? | 14.6 | 37.2 | 16.3 | 31.9 | 888 |
| Amount of funding? | 20.0 | 27.4 | 23.5 | 29.1 | 894 |
| Flexibility of use of funds? | 18.6 | 37.3 | 5.5 | 38.6 | 891 |
| Support for young scientists? | 10.8 | 36.2 | 15.0 | 38.0 | 892 |
| Impact on the prestige and career of the awarded investigators? | 28.3 | 31.0 | 4.8 | 35.8 | 890 |
| Opportunities for building new international scholarly networks? | 16.3 | 39.2 | 7.8 | 36.7 | 890 |

Source: Survey to FRIPRO applicants 2005-2007. Table 7.30 to Table 7.42 in Appendix 2 show differences between successful and unsuccessful applicants.

In the international comparison, FRIPRO scores lower than alternative funding sources – of which ERC grants were specified in the question – on all items, except the flexibility of use of funds (Table 5.11 and 5.12). Especially on prestige and amount of funding, FRIPRO scores lower than ERC/international schemes (27 percentage points lower on prestige and 23 percentage points lower on amount of funding). When only including the replies from the successful applicants, the results are more positive. FRIPRO scores higher than ERC/international schemes on opportunities offered for doing unique/original research, support for new projects without requiring preliminary research and the flexibility of use of funds, but the lower scores on prestige and amount of funding, as well as opportunities offered for addressing high-risk topics and doing interdisciplinary research, and for building new international scholarly networks, remains (Table 7.43 to Table 7.49 in Appendix 2).

**Table 5.11 FRIPRO compared to international funding sources, applicants' survey replies. Per cent.**

| Comparing FRIPRO with alternative international funding sources, and ERC funding schemes in particular, is FRIPRO poorer, about the same or better concerning: | Better | About the same | Poorer | Cannot say | N |
|---|---|---|---|---|---|
| Opportunities offered for doing unique/original research? | 10.2 | 26.0 | 22.5 | 41.4 | 885 |
| Opportunities offered for addressing high-risk topics? | 8.0 | 20.8 | 22.8 | 48.4 | 880 |
| Support for new projects without requiring preliminary research? | 9.3 | 27.0 | 12.5 | 51.2 | 882 |
| Opportunities offered for doing interdisciplinary research? | 3.2 | 30.4 | 15.3 | 51.1 | 884 |
| Opportunities offered for broadening your field of expertise? | 5.7 | 31.9 | 15.1 | 47.4 | 882 |
| Amount of funding? | 7.8 | 16.4 | 30.3 | 45.5 | 884 |
| Flexibility of use of funds? | 17.4 | 21.7 | 8.5 | 52.4 | 884 |
| Support for young scientists? | 5.9 | 27.0 | 15.4 | 51.8 | 883 |
| Impact on the prestige and career of the awarded investigators? | 4.5 | 18.5 | 31.7 | 45.3 | 881 |
| Opportunities for building new international scholarly networks? | 3.5 | 25.5 | 25.9 | 45.1 | 881 |

Source: Survey to FRIPRO applicants 2005-2007. Table 7.43 to Table 7.49 in Appendix 2 show differences between successful and unsuccessful applicants.

**Table 5.12 FRIPRO compared to Norwegian and international funding sources, applicants' survey replies. Percentage points.**

| | Difference Better – Poorer | |
|---|---|---|
| **Is FRIPRO poorer, about the same or better concerning:** | Norwegian comparison Table 5.10 | International comparison Table 5.11 |
| Opportunities offered for doing unique/original research? | 19.9 | -12.3 |
| Opportunities offered for addressing high-risk topics? | 4.7 | -14.8 |
| Support for new projects without requiring preliminary research? | -13.3 | -3.2 |
| Opportunities offered for doing interdisciplinary research? | -5.7 | -12.1 |
| Opportunities offered for broadening your field of expertise? | -1.7 | -9.4 |
| Amount of funding? | -3.5 | -22.5 |
| Flexibility of use of funds? | 13.1 | 8.9 |
| Support for young scientists? | -4.2 | -9.5 |
| Impact on the prestige and career of the awarded investigators? | 23.5 | -27.2 |
| Opportunities for building new international scholarly networks? | 8.5 | -22.4 |

Source: Survey to FRIPRO applicants 2005-2007. The table shows percentage of 'Better' minus percentage of 'Poorer' calculated from the figures in Table 5.10 and 5.11.

It should be added that the questions in Table 5.10-5.12 were designed for a survey to applicants to the Human Frontier Science Program (HFSP). The HFSP scored substantially better than both domestic and international funding sources on all items (see Langfeldt 2006, page 44 and 96 for figures). As the HFSP survey was performed before the introduction of ERC grants, FRIPRO's and HFSP's scores against international funding sources are not comparable.

## 5.4 Main findings

- A large proportion of applicants consider FRIPRO funds as offering support for research for which there is no other RCN scheme, and FRIPRO is the most popular scheme for those resubmitting FRIPRO applications. However, many applicants find alternative funding sources for their FRIPRO projects, and a majority of rejected applications seem to be implemented.
- Moreover, FRIPRO seems to open doors for other funding: a substantial proportion of those obtaining FRIPRO grants, report that the FRIPRO funding enabled them to successfully compete for funding from other external sources.
- When applicants compare FRIPRO to other Norwegian funding sources, FRIPRO scores best on the opportunities offered for doing unique/original research and on the impact on the prestige and career of the researchers. On the other hand, FRIPRO scores somewhat lower than Norwegian alternatives on opportunities offered for doing interdisciplinary research and the support for young scientists. In comparison to international funding sources (including ERC grants, which were specified in the question), FRIPRO scores lower on all items, except the flexibility of use of funds.

# 6 FRIPRO organisation and review procedures

In this chapter, we look at the terms and organisation of the FRIPRO scheme, including the application review process. More specifically, the Terms of Reference ask for advice concerning application types/terms, the design of the funding announcements, the review system, and the structure of the expert committees.

## 6.1 General terms and calls for proposals

FRIPRO is a responsive mode funding scheme, with annual open calls and few restrictions. In addition to regular research projects (3-4 years), applications for postdoc fellowships (up to 3 years) and support for events/conferences are accepted.[27] Both PhD-fellowships and postdoc fellowships may be funded as part of the research projects, and the integration of such research recruitment in the projects, as well as collaboration between senior and junior researchers, are among the review criteria. Plans for international collaboration are also a stated additional review criterion.

FRIPRO is a popular funding scheme and a large number of applications are submitted each year, whereas the funds are restricted and the rejection rates are high. Several initiatives have been taken in order to reduce the number of applications. From 2008 there are restrictions on the number of applications a researcher (PI) may submit to FRIPRO – only one application is accepted per year.[28] Moreover, from 2013 applications are not accepted from researchers who presently hold a FRIPRO project/award. The possibility of reducing the number of calls has also been discussed (biannual instead of annual calls), but not implemented.

It has also been signalled that larger projects are wanted. The minimum size limit for applications for research projects has been increased from MNOK 0.3 to 1 per year, and the maximum average funding per year is increased from MNOK 2 to 3.5. As shown in the portfolio analyses (Chapter 2.2), the result is an increase in average project size and a reduction in the number of funded projects.

The revisions of the terms for the scheme and their specifications in the call documents seem adequate in terms of reducing review costs. The restrictions reduce the need to review applications for smaller projects and multiple applications from the same PI. Moreover, by restricting the possibility of being PI for more applications or for projects run in parallel, younger and less established researchers

[27] In addition, PhD and postdoc fellows in the funded FRIPRO projects may apply for mobility grants for research sojourns at institutions abroad.
[28] The number of applications was reduced from 1019 in 2008 to 960 in 2011.

may get a chance to be PI for FRIPRO projects.[29] As noted in Chapter 4, informants were concerned about this issue and discussed how to ensure terms that allow projects from promising young researchers to compete against the many applications from older, established researchers. A separate project category for younger researchers was among the alternatives discussed.

## 6.2 The organisation of the review process

There have been some adjustments in the organisation of the review procedures during the studied period. At present (from 2011), the review is organised in four broad expert committees ('fagkomiteer'), one for biology and medicine, one for natural sciences and technology, one for the humanities and one for the social sciences. Previously, there were more committees, each covering fewer areas (nine committees in the period 2004 to 2007, seven from 2007 to 2010). The FRIPRO budget is allocated on research areas by the Research Board,[30] whereas the expert committees make the final decisions regarding grant awards within their area(s).

As a basis for the decisions in the expert committees, peer review panels rate all proposals and write a review report. The general review form for RCN applications is used, asking the reviewers to assess – on a scale from 1 to 7 (explained in note to Table 6.1) – the scientific merit of the project and the qualifications of the research group. The panel also fill in text comments in the review form. For each committee, there are 8 to 11 review panels. The panels are ad hoc and consist of non-Norwegian researchers. New panels[31] are put together each summer to match that year's applications.

Review panels were gradually introduced during the studied period. Prior to the introduction of panels, the committees based their decisions on 2-3 individual referee reports for each application.[32] With the introduction of review panels, the work of reaching a joint rating for each proposal is handled by the panels, whereas the committees' task is to balance the reviews and combine the results from the different panels into an overall ranking list and make the final decisions. In practice, the main work of the FRIPRO expert committees consists in prioritising the applications given the highest rating by the panels. This may still be a demanding task. A large proportion of the applications obtain high scores, only a small number of awards can be granted, and the proportion of highly rated applications which are funded has decreased during the studied period. This is illustrated in the table below. In 2005, 26 per cent of the applications rated 'Very good' (5) 'Excellent' (6) or 'Exceptional' (7) were funded, in 2010, only 16 per cent. Each year 60 to 69 per cent of the applications were rated 5 or better.

[29] In fact, the average age of PI for funded FRIPRO researcher projects was reduced from 50.5 in 2009 to 45.8 in 2010.
[30] Each RCN Division has a separate Research Board. FRIPRO is organised by the Division for Science and the Research Board for this division allocates the FRIPRO budgets to the various FRIPRO expert committees.
[31] Each panel member may be used up to three years.
[32] In cases where no panel fits a particular proposal (e.g. particularly interdisciplinary proposals) individual review reports are still used.

**Table 6.1 FRIPRO applications 2005-2010: proportion of applications rated 5 or better which are funded. By review committee/research area. Per cent.**

| | Application year | | | | | |
|---|---|---|---|---|---|---|
| **Review committee/research area*** | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| Natural sciences and technology | 34 | 39 | 15 | 17 | 13 | 11 |
| Technology/engineering | | | 19 | 31 | 22 | 13 |
| Biology and biomedicine | | | 21 | 17 | 19 | 18 |
| Evolutionary biology and ecology | 27 | 14 | | | | |
| Physiology/anatomy | 27 | 29 | | | | |
| Molecular biology/biotechnology | 26 | 16 | | | | |
| Clinical medicine / health sciences | | | 37 | 19 | 11 | 11 |
| Clinical medicine | 28 | 26 | | | | |
| Community medicine / health services | 23 | 71 | | | | |
| Humanities | 20 | 15 | 12 | 14 | 13 | 16 |
| Social sciences | 23 | 25 | 13 | 20 | 20 | 19 |
| Environment and development | 19 | 24 | 27 | 45 | 35 | 46 |
| Renewable energy | | | | | 39 | |
| Total per cent funded of applications rated ≥ 5 | 26 | 24 | 18 | 19 | 17 | 16 |
| Total number of applications | 1121 | 876 | 828 | 920 | 983 | 973 |
| Number of applications ≥ 5 | 701 | 578 | 569 | 580 | 594 | 589 |
| Per cent of applications rated ≥ 5 | 63 | 66 | 69 | 63 | 60 | 61 |

Sources: Documents to meetings in the RCN Science Division Board. DSV: Sak DSV 06/06; 21/07;22/08; 21/09; 19/10; 19/11. The table includes applications for research projects, postdoc fellowships and PhD projects abroad.
Rating scale: 7 – Exceptional; 6 – Excellent; 5 – Very good; 4 – Good; 3 – Fair; 2 – Weak; 1 – Poor.
*The committees and budget categories vary between years as displayed in the table.

Normally, only applications rated 6 or 7 by the panels are discussed in the expert committees (more precisely, researcher projects rated 6 or 7 and postdoc proposals rated 5, 6 or 7). The specific processes vary somewhat between the committees and between years. For the committee with the most applications, FRIMEDBIO, the RCN programme officers will normally put together a joint list based on the rankings from each panel, separating the highest ranked (proposed for funding), the lowest ranked (to be rejected) and a group of middle ranked to be discussed in the committee meeting.[33] In the FRIHUM Committee, on the other hand, all applications are read by at least two committee members before the review meeting, and the RCN programme officers do not provide any tentative joint ranking lists.

In the interviews, informants involved in the review process expressed concerns regarding the panel structure and the committee work, as well as the task division between the review panels, the expert committees and the programme officers. Overall, the later years' reorganisation of the review process was seen as a substantial improvement. The introduction of the review panels imply that the expert reviewers meet and discuss each application, which was said to give more thorough assessments than individual reviews[34]. Moreover, the joint assessments from the experts facilitate the work of the committees.

Today's review panels to some extent resemble the disciplinary review committees in the RCN in the early 1990s. There were separate committees for each discipline (in total about 25), which reviewed the applications (mostly without external review reports). The difference is that today's panels are *ad hoc*, anonymous (until the funding decisions) and appointed without the involvement of any RCN board. The limited time available between the application deadline and the appointment of panel members would be a hindrance in terms of involving the Research Board. This leaves a great responsibility to the RCN programme officers; they are the key actors both in selecting panel members, allocating applications to panels and between panel members (1st and 2nd reader), and in summarising the results of the panel meetings as input to the committee meetings. The informants where aware of this responsibility, and neither RCN programme officers nor Committee chairs seemed uncomfortable with this. On the other hand, some were concerned about the challenges in ensuring

[33] The present FRIMEDBIO committee comprises two research areas – medical sciences and biology – with separate budgets. Hence, separate lists are made for the two areas.
[34] The panel members also score the applications individually before the panel meeting.

adequate expertise in all panels and for all applications. The applications are diverse, and larger and broader applications which may be difficult to assess, are submitted. Informants suggested various ways to better ensure competence in the panels: To have more panel members[35], to have separate panels for multidisciplinary proposals and proposals not fitting disciplinary panels and to more frequently use the reviewers suggested in the applications. Moreover, it was stated that more efforts could be used on monitoring the quality of the panel review reports, and opening for the possibility of asking the panel for a revised report when the committee detected errors or shortages.

Informants also commented on the changed role of the expert committees. They have become more multidisciplinary and handle a larger number of applications – for which much time is spent. At the same time, much of their previous tasks are taken over by the review panels and the programme officers. Hence, some discussions and clarifications of their role may be needed to ensure that the committee members find their work meaningful and worthwhile. It should be added that the handling of conflicts of interest is a constant concern in the review of the applications, and one reason for the changed role of the expert committees. Presently, 50 to 70 per cent of the committee members are Norwegian and also the non-Norwegian members (who are Scandinavians) may have extensive collaboration links to applicants. Consequently, it is demanding to organise the work and ensure no conflicts of interest occur.

A general concern of many of the informants was the low success rate and disappointed applicants not trusting the process (see next section). More openness about the process and better communication with applicants were seen as ways to improve the situation.

## 6.3 Feedback to applicants and the applicant's perceptions of the process

In the survey, the applicants were asked about their satisfaction with the application and review process – indicating their satisfaction on a scale from 1 to 5 (1= 'Not at all' and 5= 'To a high extent'). Not surprisingly, those who obtained funding from FRIPRO were more satisfied than those who did not. The difference is particularly large concerning the competence of the review committee, the transparency of funding decisions, clarity and completeness of the feedback to applicants, as well as the support during the application process and the overall cost efficiency of the application process (funded applicants rate on average 0.7-0.8 higher than non-funded on these issues). Table 6.2 shows the 'average replies' for funded and non-funded applications.

[35] In 2011, the number of members per panel varied from 3 to 7.

**Table 6.2 Applicants' satisfaction with the application and review process. Average of applicants replies (1= Not at all; 5= To a high extent) by result of application.**

| Considering your FRIPRO applications in general, to what extent were the following RCN (funding) processes satisfactory? | Obtained FRIPRO funding | | Total average | N |
|---|---|---|---|---|
| | Yes | No | | |
| Access to relevant background information for the call (utlysningen) | 4.2 | 3.8 | 3.9 | 876 |
| Clarity and easy to understand information about the call (utlysningen) | 4.1 | 3.7 | 3.8 | 893 |
| User-friendliness of the online application system | 3.8 | 3.6 | 3.6 | 902 |
| Support during the application process | 3.7 | 3.0 | 3.2 | 719 |
| The types of applications and size of projects accepted (in the call for applications) | 3.5 | 3.0 | 3.1 | 718 |
| The competence of the review committee (fagkomiteen) | 3.7 | 2.9 | 3.1 | 733 |
| Transparency regarding funding decisions | 3.0 | 2.3 | 2.5 | 829 |
| Clarity and completeness of the feedback to applicants | 3.4 | 2.7 | 2.9 | 888 |
| The overall cost efficiency of the application process | 3.2 | 2.4 | 2.6 | 769 |
| User-friendliness of the reporting system (framdrifts- og sluttrapporteringssystem) | 3.5 | 3.3 | 3.4 | 621 |

Source: Survey to FRIPRO applicants 2005-2007. Respondent answering "cannot say" are not included in the calculation.

Both funded and non-funded applicants are most satisfied with the access to relevant background information for the call, and least satisfied with the transparency regarding funding decisions. 80 per cent of the funded and 60 per cent of the non-funded indicate 4 or 5 for access to relevant information for the call, whereas only 33 per cent of the funded and 14 per cent of the non-funded indicate 4 or 5 for transparency. Also the overall cost efficiency of the application process is scored low. 44 per cent of the non-funded and 22 per cent of the funded indicate 1 or 2 for this issue. Hence, many applicants, also those who are successful, consider that too much time is spent on the application process.

The applicants' free text comments to the question about the review process elaborates their concerns about reviewer competence, variations and unpredictability in the assessments (same application submitted several times), non-transparent processes, as well as the chances of younger applicants, and high-risk and interdisciplinary research of obtaining funding. Below is a small selection of the many comments on these issues.

- *The problems are 1) insufficient funds for FRIPRO & 2) intransparency of de facto priorities and funding decisions.*
- *For my project, the application processes have been a bit frustrating. We have received rather different, also contradictory, reviews from one year to another year, and have therefore been left somewhat in the dark as to what we should do in order to improve it. The impression, which I know is shared by other applicants, is that the final result is more arbitrary than one would hope it to be.*
- *The majority of reviewers had not even basic understanding of the field. They might be good researchers but in other fields, which makes them novices in any given other field.*
- *I think the competence of the reviewers vary a great deal, and I also believe that they interpret their role in the review process very differently: Some see themselves as judges, others as advocates for particular research fields.*
- *This is a really difficult problem. Obviously the reviewers are more likely to fund what they understand. It is my impression that European Panels are more likely to understand complex ideas whereas RCN panels are more likely to fund based on CV and safe but not so interesting projects. In some cases (FriPro applications other than the ones funded) they have understood nothing. I cannot blame all this on the reviewers as one can just say it is a poorly written application. But, I think it unrealistic to believe that one will be able to find panels and committees that are able to spend as much time on an application as is needed to fully comprehend it. I don't think this will ever be possible.*
- *[I have] variable [experiences] - in most cases the review has been fair, however, it has happened that that the panel clearly were not capable to assess all fields of involved research.*

- *The reviewers of RCN are incompetent, and highly biased.*
- *The committee thought it was not feasible to do the work. We therefore think that they were not experienced in this type of research. The project is running.*
- *I find this [competence of the reviewers] hard to judge. I did not caught any of reports in making obvious mistakes, but still I have the feeling that the referees are more judging the track record of the applicants, than the project as such.*
- *I wrote a rebuttal letter regarding unacceptable review and specifically requested not to have the same reviewer/panel for the [next] application. I received no feedback regarding arguments in my rebuttal letter and as far as I know the same panel again reviewed my application. Unfortunately, I have to admit that I trust neither the integrity nor the qualifications of the reviewer who has handled my applications the last 3 years.*
- *There can be significant differences in the opinion of two reviewers, otherwise I consider the review fair.*
- *The following year this was very different and the reviewers had a deeper understanding of relevant theories and [the] project. The comments from one of the reviewers were particularly helpful. If reviewers were allowed to discuss the projects with each other during assessment it would probably be a quality assurance and less dependent on 'good luck'.*
- *I feel that the quality of the reviewers may have declined since 2005 – presumably related to time constraints for the very best.*
- *There is a lot of power embedded in the selection of individual peer reviewers, this process is internal to RCN and not transparent.*
- *It is of course difficult to find the right referees for all applications, but more efforts should be made; NFR should ask for external help in determining referees. Panels have too few members and are not expert enough, often.*
- *Our research is multidisciplinary with a problem traditionally tied to biology and medicine but using methods from physics, informatics and mathematics. It seems that the present review and decision process unintentionally biases against such multidisciplinary projects.*
- *Multidisciplinary applications tend to be assessed in unidisciplinary perspective.*
- *I would say that the reviewers in programmes such as FUGE and the Cancer Research Programme in RCN have been willing to support more original and high-risk research, more science going into new areas etc. than the reviewers of the FRIPRO programme. This based on approx 20 applications of mine. One would think that this should be the opposite based on how the FRIPRO programme is organized. This could of course be highly individual experiences, but I hear the same from others and would think that this has to do with the quality of the reviewers and format of the review as well the ability of RCN staff working with the FRIPRO programme to recruit good reviewers and instruct them properly.*
- *Evaluation of project management: the evaluation does not distinguish between new independent project managers and established ones. This could bias PIs with a long track record over start-up groups.*
- *I believe the process could have been improved if there was a round were one could reply to possible mistakes regarding the application. In that way possible false reasons to weaken an application could be avoided.*
- *In a system with less than 10% probability of funding, (i) there is low cost-efficiency as many people waste a lot of time writing and evaluating proposals that will not get funded and (ii) the evaluation fairness breaks down as too many excellent proposals have to be rejected.*

Compared to data from a previous survey to applicants to the European young investigator Award scheme (EURYI), FRIPRO scores better than EURYI on the feedback to applicants (Langfeldt and Solum 2007). The EURYI applicants were asked to what extent the feedback they received from the selection process was helpful for them in understanding the reasons behind the outcome. Between 37 and 59 per cent of them indicated 1 on a scale from 1 to 5 (varies between the domestic and European review process and between the different calls).[36] Only 11 per cent of the FRIPRO applicants indicate 1 for feedback. An average just above 3 – the middle score – for funded FRIPRO

[36] 1=Unhelpful; 5=Helpful. Results differ, as expected, between the funded and the non-funded (Langfeldt and Solum 2007:98).

applicants (3.4) and below 3 for non-funded applicants (2.7) is still not satisfactory, and applicants call for improvement.

As mentioned, the funded FRIPRO applicants rate the competence of the review committees considerably higher (3.7 on average) than the non-funded applicants do (2.9 on average). This may indicate a general higher satisfaction of the funded applicants, or that applicants whose competence match that of the review committee have a higher chance of being funded (better match because they for instance belong to mainstream research areas, and do not require specific interdisciplinary or uncommon competence). More important than matching competence in the review committee, is matching competence in the review panels/among the individual reviewers. Data on this issue are presented in Table 6.3, along with similar data from a survey to applicants to the Human Frontier Science Program (HFSP). The results indicate that the non-funded FRIPRO applicants rate the competence of the reviewers similar to or higher than the non-funded HFSP applicants. Both groups of non-funded applicants rate 2.9 on the ability of the reviewers to assess all the fields of research involved in the application, FRIPRO applicants rate higher on thorough assessment (2.9 compared to 2.5), slightly higher on impartial and unbiased assessments (3.1 compared to 2.9). However, looking at the results for the funded applicants, the picture is different. Here the HFSP score better than FRIPRO – the difference between the satisfaction of funded and non-funded applicants is considerably higher in the HFSP scheme than in FRIPRO. Whereas HFSP awardees on average rated 4.4 to 4.5 on the three questions, those who have obtained FRIPRO funding rate 3.7 to 3.9. The smaller difference between the funded and non-funded FRIPRO applicants may indicate that they have more mixed experiences than the HFSP applicants. Many FRIPRO applicants have submitted multiple FRIPRO applications – of which some are rejected and some funded – and may as a consequence have more 'balanced' views on the review process.

**Table 6.3 Applicants' confidence in the review process. Average of applicants replies (1=Not at all; 5=To a high extent), by result of application.**

| To what degree do you think the FRIPRO panel/individual reviewers that assessed your application: | HFSP | | FRIPRO | | FRIPRO | |
|---|---|---|---|---|---|---|
| | Funded | Not funded | Funded | Not funded | Total average | N |
| Was able to assess all the fields of research involved in the application? | 4.5 | 2.9 | 3.7 | 2.9 | 3.1 | 811 |
| Provided an impartial and unbiased assessment of your application? | 4.5 | 2.9 | 3.9 | 3.1 | 3.3 | 787 |
| Provided a thorough assessment of your application? | 4.4 | 2.5 | 3.7 | 2.9 | 3.1 | 830 |

Sources: Survey to FRIPRO applicants 2005-2007. Survey to HFSP applicants 2000-2005 (Langfeldt 2006). Respondents answering "cannot say" are not included in the calculations.

Applicants were moreover asked about their views on the FRIPRO review policies and processes. Also these questions were copied from the HFSP survey (with one additional issue – the support of original and ground breaking research). Table 6.4 presents the results.

**Table 6.4 Applicants' opinions about review policies and processes: Average of applicants replies (1= Not at all; 5= To a high extent), by result of application.**

| In your opinion, to what degree does the FRIPRO scheme have the appropriate policies and review processes to: | Average HFSP awardees | Obtained FRIPRO funding | | Total average FRIPRO | N |
|---|---|---|---|---|---|
| | | Yes | No | | |
| Support the most promising and important research (in your field of research)?* | 4.5 | 3.8 | 3.0 | 3.2 | 798 |
| Facilitate interdisciplinary research? | 4.6 | 3.5 | 2.9 | 3.1 | 678 |
| Support high-risk research? | 4.0 | 2.9 | 2.3 | 2.5 | 673 |
| Support well-founded and solid research? | 4.1 | 4.0 | 3.6 | 3.7 | 784 |
| Support original and ground breaking research? | - | 3.6 | 2.9 | 3.1 | 755 |
| Assess the potentials of young scientists/select the best talents? | 4.4 | 3.2 | 2.6 | 2.8 | 689 |

Sources: Survey to FRIPRO applicants 2005-2007. Survey to HFSP applicants 2000-2005 (Langfeldt 2006). Respondents answering "cannot say" are not included in the calculations.
* In the HFSP survey this item was phrased 'Support the most promising and important research on complex mechanisms of living organisms' which is the aim of the HFSP.

FRIPRO obtains the lowest score on support for high-risk research (average 2.5), and the highest score for supporting well-founded and solid research (average 3.7). In comparison with the HPSP, FRIPRO score lower on all items. On support for high-risk research, the funded HPSP applicants on average rate their programme 1.1 higher than the funded FRIPRO applicants do. The difference is also notable when we include both funded and non-funded applicants in the analysis. Whereas only 5 per cent of all FRIPRO applicants indicate 5 for high-risk research, 18 per cent of the HFSP applicants indicate 5 for this issue. The difference is even larger on the questions concerning interdisciplinary and supporting the most promising and important research. Whereas only 7 per cent of the FRIPRO applicants indicate 5 for facilitating interdisciplinary research, 42 per cent of the HFSP applicants indicate 5 for this issue (both funded and non-funded included). Moreover, 14 per cent of the FRIPRO applicants give top score on supporting the most promising and important research, whereas 30 per cent of the HFSP applicants give top score on this issue (both funded and non-funded included, Table 6.4 shows comparable figures for average scores given by funded applicants only). The higher scores given to the HFSP on these items may be explained by differences in the overall aims of the two funding schemes. The HFSP is a funding scheme aimed at basic research within a given area (the complex mechanisms of living organisms), and FRIPRO is a scheme for basic research in all research fields and there are no restrictions on topics. Moreover, the HFSP is specifically aimed at facilitating interdisciplinary research, whereas FRIPRO is not.

## 6.4 Main findings

- When asked to rate the FRIPRO review policies and processes, applicants give the highest score on the ability to support well-founded and solid research, and the lowest score on support for high-risk research. The funded FRIPRO applicants rate the competence of the review committees considerably higher than the non-funded applicants do. This may indicate generally higher satisfaction among the funded applicants, or also that applications that closely match the competencies in the review committee have a higher chance of being funded. In terms of the application process, both funded and non-funded applicants are most satisfied with the access to relevant background information for the call, and least satisfied with the transparency of funding decisions. Comments from applicants demonstrate considerable frustration and distrust concerning the review process.
- Informants involved in the review process consider the reorganisation of the review process that took place in the later years to mark a substantial improvement. The introduction of the review panels imply that the expert reviewers meet and discuss each application. This enables more

thorough assessments than individual reviews and, at the same time, the joint assessments from the experts facilitate the work of the FRIPRO committees which make the funding decisions.

- Ensuring adequate expertise in all panels and for all applications is still a central challenge. The applications are diverse, and larger and broader applications may be difficult to assess. Informants suggested various ways to better ensure competence in the panels, including more panel members, separate panels for multidisciplinary proposals and proposals that do not fit into the disciplinary panels, and more frequent use of reviewers proposed by applicants.

# 7 Overall conclusions and recommendations

This chapter addresses the overall questions in the Terms of Reference for the evaluation: (1) the degree to which the FRIPRO scheme achieves its objectives, (2) the significance of funding for independent projects for the research institutions, and (3) recommendations which the Research Council can integrate into the further development of the scheme.

## 7.1 Does FRIPRO achieve its objectives?

The main objectives of the FRIPRO scheme are to support research of outstanding scientific quality and foster the development of basic theory and methods and scientific renewal. Moreover, the scheme is designed to promote research recruitment and the international orientation and collaboration in the research communities.

The data provide diverging answers regarding FRIPRO's goal achievement. On the one hand, funded applicants more often report high impacts of their projects than rejected applicants who have implemented their project with other resources. Survey replies indicate added value on publication output and international collaboration, whereas this is not corroborated by the bibliometric data. The bibliometric data show that during the studied period, the funded applicants have a higher publication productivity, citation impact and proportion of international co-authorship, but these characteristics do not seem to be affected by the FRIPRO funding. Likely explanations for lack of measurable effects are that we have only studied the publications of the PIs – not the whole research team – the PI may not be a listed author of all publications resulting from the project, PIs' research is often funded by multiple sources and their publications are part of lager research 'projects'. Hence, measurable effects of one research grant on the overall publication pattern of PIs who already score high on bibliometric indicators cannot be expected. Similar findings in other studies corroborate this.

Also for the other objectives the survey data indicate a substantial significance and added value for research. A large majority of successful applicants report that the project has explored new research areas of significant importance for their future research, and produced unexpected results of importance to the research field. A substantial proportion of the applicants report that their FRIPRO projects are more oriented towards basic research and provide more new scientific results, than their other projects. Moreover, the funded applicants more often characterise their FRIPRO projects as more scientifically risky and more multidisciplinary than their other projects.

On the other hand, some informants consider that FRIPRO has difficulties in assessing and funding scientifically risky projects and/or projects that combine several research fields. When asked to rate FRIPRO's review policies and processes, applicants give lowest score to support for high-risk research (average 2.5 on a scale from 1 to 5). Ability to facilitate interdisciplinary research is rated somewhat higher, but also here the score is mediocre (average 3.1). The highest score is obtained for supporting well-funded and solid research (average 3.7). Concerning opportunities for addressing high-risk topics, applicants rate FRIPRO lower than international funding sources, but slightly better than other Norwegian sources. Concerning opportunities offered for doing interdisciplinary research, FRIPRO scores lower than both international and other Norwegian sources. Hence, the data indicate that FRIPRO funds basic research providing important new scientific results, but data are non-conclusive concerning high-risk research and multi/interdisciplinarity.

Concerning research recruitment and competence building, FRIPRO's goal achievement seems high. A large proportion of the applicants report positive impacts on their research career. Of those below 40 years old, about 60 per cent of successful FRIPRO applicants fully agree that the project has had positive career impacts. In addition, 40 per cent of the unsuccessful applicants in this age group fully agree that the project has had positive career impacts. Many rejected FRIPRO applicants obtain other funding, and in real numbers rejected FRIPRO applications have resulted in more PhDs than the funded projects. This indicates both that some research environments applying for FRIPRO projects have alternative funding sources for recruitment positions, and that the FRIPRO application and review process may increase the likelihood for obtaining other funding.

The moderate quotas applied by FRIPRO to help female researchers to qualify for senior positions, seem effective. The proportion of applications from female researchers has increased during the studied 6-year period, and the success rate of female applicants has increased. Overall in the studied period, male and female applicants have very similar success rates, both for applications for postdoc fellowships and for research projects. On the other hand, in the 'harder' fields of research the success rate is higher for older than for younger applicants. Hence, special measures to counteract the disadvantages of younger applicants might be appropriate (for applications for research projects only; for the fellowships the youngest have the highest success rate).

In sum, the FRIPRO scheme is found to achieve its objectives concerning supporting basic research of high scientific quality which is internationally orientated (ensured by funding the applicants with the best track record). Moreover, FRIPRO is important for research recruitment and good at providing opportunities for female researchers. Results are somewhat mixed concerning scientific renewal. Funded applicants more often characterise their FRIPRO projects as more scientifically risky and more multidisciplinary than their other projects, but in general the applicants do not rate FRIPRO highly on facilitating high-risk and interdisciplinary research.

## 7.2 Significance for the research institutions

The data show a clear niche for the FRIPRO scheme as a high ranking scheme for university researchers. A large proportion of the most active Norwegian researchers apply for FRIPRO funds, and FRIPRO scores high on prestige compared to other Norwegian funding sources. The universities are the main target group of the scheme (86 per cent of the funding) and the scheme is highly appreciated also at the institutional level. Researchers are encouraged to apply for funds and information about calls is actively distributed at the universities. Informants consider that there is a need for much more research funding than that available at the university, and that FRPRO it is an open, general scheme which suits the different needs of the different research environments. The importance of FRIPRO seems especially high within the humanities where there are few other external funding sources.

FRIPRO funding is reported to have considerable effects on the research department's reputation, whereas effect on the department's ability to prioritise research areas, group structure and how research is performed seem small.

## 7.3 Recommendations

The data point to some challenges in the terms and organisation of the FRIPRO scheme which should be discussed. There is a tension between the scheme's role as the only national funding scheme open to all research fields regardless of topic and purpose, and the role as an elitist scheme for outstanding research, funding only a small proportion of the applications submitted. It is hardly possible to cater for all research fields and to identify new promising areas and groups, when the success rates are very low and top rating and a convincing track record is demanded for an application to succeed. In a context with tight budgets and high rejection rates, grant review processes tend to strengthen established research more than scientific renewal (Langfeldt 2001). The outcome of peer review very much depends upon the selection of reviewers, and the task of the RCN in organising peer review for a highly attractive, but small, funding scheme which is supposed to contribute to scientific renewal is a very demanding responsibility. This is envisaged in frustrations and complaints in the survey replies from FRIPRO applicants. Many applicants comment that it is difficult to get FRIPRO support for original and high-risk research, and that too much emphasis is put on applicants' track record or that there is too much 'luck of the reviewer draw'.

In this situation, two overall challenges relating to the future of the FRIPRO scheme need to be discussed. Firstly, to what extent should scientific renewal be a major objective of the FRIPRO scheme; secondly, how can the applicants' confidence in the review process be improved.

If RCN wants scientific renewal to be a major objective of the FRIPRO scheme, there should be some monitoring of how scientific renewal is emphasised in the review process, and the RCN should more actively attempt to select reviewers who are known to be concerned about high-risk research and scientific renewal, and good at identifying promising research projects according to such criteria. Moreover, the review guidelines should more explicitly ask the review panels, as well as the expert committees, to give higher priority to new and small promising research fields than to established research fields. Notably, it is hard to measure scientific renewal, and the present data on FRIPRO's contribution to scientific renewal is inconclusive. Still, monitoring the review process based on available data such as success rates by age of PI (as is already done for success rates by gender) and the distribution of funds by new and previous FRIPRO PIs and groups, should be useful indicators of whether the process is conservative or open to new fields and groups. The implemented restrictions on the possibility of being PI for more applications or for projects run in parallel, seems adequate in this respect. More generally, an increase in the FRIPRO funding, as implemented with 'Fellesløftet' (see Section 1.1), reduces the problems resulting from low success rates.

The alternative to scientific renewal as a major objective, is to put prime emphasis on applicants' past scientific record and let scientific renewal be an additional objective – which seems to be current procedure in many of the 'harder' scientific areas studied in this evaluation.

Concerning applicants' confidence in the review process, more information and better communication of the review terms and procedures seem needed. Generally, the RCN has transparent review processes – applicants get a copy of the review report and the names of review panel members and lists of awarded projects are published on the RCN web site. Applicants still want more information about the process. Key information that would help applicants to better understand the terms for the competition they take part in, include the criteria for dividing the budget between research areas and more information on 'who competes with whom' – some of the expert committees have separate budgets for different research areas, but some applicants still think they compete with different areas. Moreover, general information on the priorities and concerns of the expert committees when making

the final decisions and overall application statistics would help applicants better understand the outcome. Information on the decisions of the expert committees should include overall policy concerns, the handling of conflicts of interest, the extent to which shortages and errors in panel review reports are detected, as well as information on how the moderate gender quotas and the moderate quotas for candidates with a professional education are handled. Overall application statistics should include the proportion of applications obtaining high scores and the proportions of the best applications within each research area which are not funded. Publishing such information on the FRIPRO web site should give applicants more insight into the limitations of the review process in terms of the number of applications which obtained the highest scores (6 and 7) in the various research areas, but did not obtain funding.

More generally, the work of composing review panels and assigning applications between panel members, and ensuring the quality of review reports, is highly important both for a thorough and fair review process, and for applicants' confidence. The RCN should consider the possibilities of increased efforts in monitoring the quality of the review, e.g. by allowing for time for the expert committee to comment on errors and shortages in the panel reports, and get a revised version/additional report before the final decision; or by giving the applicants the opportunity to comment on errors and shortages before the final meeting in the expert committee. At the same time, the need for a thorough review process needs to be balanced against resources and time available. This is a general challenge in peer review – to ensure thorough and fair review, without increasing the time from application to project start-up, or to overload the research community with review work.

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# Appendix 1 Terms of Reference for evaluation

## Mandate for the evaluation of the funding scheme for independent projects (FRIPRO)

### 1. Introduction

In consultation with the Ministry of Education and Research, the Research Council of Norway has decided to launch an evaluation of the funding scheme for independent projects (FRIPRO). Funding for independent basic research projects has a long history in Norway, with roots going back to the former research councils through to the Research Council today. The purpose of this evaluation is to acquire a more systematic overview on which to base the Research Council's efforts to further refine the FRIPRO scheme as an instrument for promoting basic research of high scientific merit. Thus, the evaluation will focus on the role and impact of the scheme in recent years, i.e. the period from 2005 to the present.

### 2. The objectives of the FRIPRO scheme

The FRIPRO scheme is one of the Research Council's key funding instruments for fostering basic research. The FRIPRO scheme seeks to promote research of outstanding scientific quality by making funding available in an open national competitive arena that is independent of any specific thematic orientation. The scheme is designed to promote recruitment, encourage development of basic theory and methods and increase scientific renewal within disciplines.

### 3. The purpose of the evaluation

**The evaluation is to:**

- assess the degree to which the FRIPRO scheme achieves its objectives, and how;
- assess the significance of funding for independent projects for research institutions;
- provide recommendations which the Research Council can integrate into the further development of the scheme.

### 4. Key issues to be addressed by the evaluation

*Research quality*

- Does the FRIPRO scheme lead to research projects of high scientific quality? Assess the quality and volume of the research funded.
- To what extent does the FRIPRO scheme promote scientific development and competence-building within the research communities?
- What role does the FRIPRO scheme play vis-à-vis the various subject areas? Does the funding scheme fill the same function or play the same role in all the subject areas?

- To what extent does the FRIPRO scheme promote scientific development across established subjects and disciplines?

*Impact on structure and strategic focus*

- *What impact does the FRIPRO scheme have on the structure and strategic focus of the research communities? Does it promote the establishment of researcher groups? What is its significance as a funding scheme for established researchers versus younger, unestablished* researchers?
- To what extent does funding under the FRIPRO scheme constitute an integral component of the institutions' strategic activities?
- To what extent do the Research Council's intentions for the FRIPRO scheme (its objectives) harmonise with the expectations of the research communities or research institutions relating to the scheme? Have there been any observable changes in this during the period to be evaluated?
- What role does the FRIPRO scheme play in terms of the distribution of tasks between the Research Council and the university and university college sector? Is there an observable distribution of roles between the Research Council and the university and university college sector with regard to funding for basic research and recruitment (independent project funding versus basic allocations)?
- What role does the FRIPRO scheme play vis-à-vis the independent research institute sector? Assess this role in the context of the scheme's objectives.

*Recruitment*

- What impact has the FRIPRO scheme had on researcher recruitment, and how does this compare with the institutions' recruitment responsibilities? To what extent do projects funded under the FRIPRO scheme influence the institutions' recruitment plans and activities?
- What has been the impact on recruitment of the moderate quotas employed for post-doctoral candidates with professional educations in medicine, odontology and psychology, and how is this quota practice perceived by the relevant research communities?

*Additional guidelines in the calls for proposals*

- During the period to be evaluated, moderate gender quotas have been applied in connection with grants to researcher projects and personal post-doctoral research fellowships. Has the FRIPRO scheme helped to strengthen the position of the underrepresented gender in the research communities?
- When assessing proposals under the FRIPRO scheme, importance is attached to whether projects incorporate plans for international research cooperation. To what extent has this enhanced the international orientation of the research communities?

*Areas of interface between the FRIPRO scheme and other research funding schemes*

- The evaluation must also consider the areas of interface between the FRIPRO scheme and the other Research Council funding instruments, including the various centre schemes. Do the research communities feel there is adequate coordination between the various funding

sources at the Research Council? Is the FRIPRO scheme seen as filling a role that the other Research Council funding instruments do not?

- To what extent has funding under the FRIPRO scheme enabled the research communities to successfully compete for funding from other external sources?
- How do the research communities rate the significance of the FRIPRO scheme in relation to funding schemes at the European Research Council?

*Additional issues*

- Do elements relating to the organisation of the FRIPRO scheme – the design of the funding announcements, application types employed, assessment system, structure of the expert committees – strengthen or pose obstacles to the achievement of the scheme's objectives?

## 5. Delimitation of the evaluation

*Period to be evaluated*
The evaluation will cover the period 2005-2010 (i.e. the funding announcements issued for projects starting in the period 2006-2011).

*Application types*
The FRIPRO scheme primarily employs two application types: Researcher Projects and Personal Post-doctoral Fellowships. These will be a major focus of analysis in the evaluation.

## 6. Methodological approach

The Research Council requires the evaluator to use a methodological approach comprising questionnaires, interviews (of project managers, deans and heads of department in the university and university college sector, institute managers in the independent research institute sector, employees, board and committee members at the Research Council, among others) as well as other qualitative methods. This is to be supplemented by analyses of the Research Council's internal statistics, national statistics on research funding, relevant registry data and relevant publication lists, etc.

An in-depth survey of all the FRIPRO projects concluded in a given year is to be conducted in the form of a questionnaire supplemented by analyses of material from the Research Council, publication analyses and bibliometric analyses.

A questionnaire is to be sent to all applicants whose grant proposals were rejected in a given year to collect information about what subsequently happened to them and their projects. Observations on the Research Council's overall grant application process as to interdisciplinary grant proposals are also to be collected from this group.

The evaluator will be requested to consider the need for organising open seminars as part of the knowledge-gathering process.

The evaluator will be requested to describe the project design in more detail in the submitted tender, including an explanation regarding the choice of methods and use of sub-studies.

## 7. Organisation of the evaluation

The evaluation will be conducted by an external evaluator selected in connection with a call for tenders.

In consultation with the evaluator, the Research Council will consider the need for appointing a reference group for the evaluation.

## 8. The evaluation report

The final report is to be based on knowledge culled from qualitative analyses and assessments and provide clear recommendations to the Research Council on the use and further development of the FRIPRO funding scheme. The evaluator must be able to read Norwegian but the report is to be submitted in English.

## 9. Available background material

- Annual overview reports on application processing under the FRIPRO scheme for the period 2005-2010
- Terms for the calls for proposals – annual reports submitted to the Research Board of the Division for Science for the period 2005-2010
- Key figures for the Research Council: statistics for projects, allocations and grant applications at the Research Council of Norway for 2009
- Case documents of the Research Board of the Division for Science related to determining the budget parameters of the FRIPRO scheme (case no. DSV 6/10 and DSV 33/09)
- Funding R&D in the university and university college sector: the role of the Research Council (case no. HS 71/2010 of the Executive Board of the Research Council)
- Reports on project results under the FRIPRO scheme (progress and final reports), and project summaries in the Research Council's project archive
- Additional documentation in the project portfolios of the FRIPRO scheme and other relevant programmes and initiatives which is available in the Research Council's databases

# Appendix 2 Tables

**Table 7.1 Success rates FRIPRO applications 2005-2010, by research area and PI's gender.**

| Research area | Gender PI | Rejected | Funded | Not reviewed | N |
|---|---|---|---|---|---|
| Humanities | Women | 83.7 | 10.9 | 5.3 | 486 |
| | Men | 88.1 | 7.8 | 4.1 | 561 |
| | Unknown | 86.1 | 9.3 | 4.7 | 1047 |
| | Total | 83.7 | 10.9 | 5.3 | 486 |
| Natural sciences (incl. mathematics) | Women | 83.8 | 13.8 | 2.3 | 427 |
| | Men | 81.3 | 15.6 | 3.1 | 1361 |
| | Unknown | 75.0 | .0 | 25.0 | 4 |
| | Total | 81.9 | 15.1 | 3.0 | 1792 |
| Medical sciences | Women | 84.6 | 11.2 | 4.3 | 635 |
| | Men | 81.7 | 12.0 | 6.3 | 1087 |
| | Unknown | 0.0 | 0.0 | 100.0 | 1 |
| | Total | 82.7 | 11.7 | 5.6 | 1723 |
| Social sciences | Women | 81.9 | 12.4 | 5.7 | 436 |
| | Men | 83.5 | 11.4 | 5.2 | 581 |
| | Unknown | 100.0 | .0 | .0 | 1 |
| | Total | 82.8 | 11.8 | 5.4 | 1018 |
| Engineering | Women | 72.7 | 20.5 | 6.8 | 44 |
| | Men | 82.4 | 9.3 | 8.3 | 205 |
| | Unknown | 80.7 | 11.2 | 8.0 | 249 |
| | Total | 72.7 | 20.5 | 6.8 | 44 |
| Agriculture and fishery | Women | 100.0 | | | 3 |
| | Men | 100.0 | | | 2 |
| | Unknown | 100.0 | | | 5 |
| | Total | 100.0 | | | 3 |
| Total | Women | 83.4 | 12.1 | 4.5 | 2031 |
| | Men | 82.8 | 12.4 | 4.8 | 3797 |
| | Unknown | 66.7 | | 33.3 | 6 |
| | Total | 83.0 | 12.3 | 4.7 | 5834 |

Source: RCN application data. Table includes applications for research projects, post doc projects and PhD project (5834 of the 6064 applications in the period).

**Table 7.2 Success rates FRIPRO applications 2005-2010, by PI's age and gender.**

| Age | Gender | Rejected | Funded | Not reviewed | N |
|---|---|---|---|---|---|
| Up to 29 | Women | 72.9 | 25.0 | 2.1 | 48 |
| | Men | 66.1 | 25.0 | 8.9 | 56 |
| | Total | 69.2 | 25.0 | 5.8 | 104 |
| 30-39 | Women | 78.7 | 16.9 | 4.3 | 555 |
| | Men | 81.7 | 14.6 | 3.7 | 701 |
| | Total | 80.4 | 15.6 | 4.0 | 1256 |
| 40-49 | Women | 82.4 | 13.5 | 4.2 | 550 |
| | Men | 83.5 | 12.9 | 3.6 | 887 |
| | Unknown | 100.0 | | | 1 |
| | Total | 83.1 | 13.1 | 3.8 | 1438 |
| 50-59 | Women | 83.5 | 12.3 | 4.2 | 284 |
| | Men | 80.5 | 15.6 | 3.9 | 825 |
| | Total | 81.2 | 14.8 | 4.0 | 1109 |
| 60 and above | Women | 87.0 | 7.4 | 5.6 | 108 |
| | Men | 85.0 | 10.4 | 4.6 | 367 |
| | Total | 85.5 | 9.7 | 4.8 | 475 |
| Unknown | Women | 90.1 | 4.7 | 5.1 | 486 |
| | Men | 85.1 | 7.7 | 7.2 | 961 |
| | Unknown | 60.0 | | 40.0 | 5 |
| | Total | 86.7 | 6.7 | 6.6 | 1452 |

Source: RCN application data. Table includes applications for research projects, post doc projects and PhD project (5834 of the 6064 applications in the period).

**Table 7.3 Applicants' comparisons of FRIPRO with their other projects. Survey replies by result of FRIPRO application.**

| **Please compare the nature of your most recent FRIPRO project with your other R&D projects (forsknings- og utviklingsprosjekter) and indicate which projects:** | | The FRIPRO project | No difference | My other projects | Cannot say /NA | |
|---|---|---|---|---|---|---|
| a) are most strategically important to your organisation? | Funding | 35.2 | 34.0 | 10.7 | 20.1 | 244 |
| | No funding | 29.4 | 31.5 | 13.9 | 25.2 | 238 |
| | Total | 32.4 | 32.8 | 12.2 | 22.6 | 482 |
| b) are most oriented towards basic research? | Funding | 48.2 | 34.3 | 2.9 | 14.7 | 245 |
| | No funding | 41.1 | 27.1 | 7.6 | 24.2 | 236 |
| | Total | 44.7 | 30.8 | 5.2 | 19.3 | 481 |
| c) provide most new scientific results? | Funding | 38.8 | 40.4 | 5.3 | 15.5 | 245 |
| | No funding | 30.2 | 37.4 | 8.5 | 23.8 | 235 |
| | Total | 34.6 | 39.0 | 6.9 | 19.6 | 480 |
| d) are most scientifically/technologically risky? | Funding | 27.5 | 41.4 | 8.2 | 23.0 | 244 |
| | No funding | 17.1 | 42.7 | 11.1 | 29.1 | 234 |
| | Total | 22.4 | 42.1 | 9.6 | 25.9 | 478 |
| e) have the highest scientific quality? | Funding | 28.6 | 53.1 | 2.9 | 15.5 | 245 |
| | No funding | 26.9 | 41.5 | 7.7 | 23.9 | 234 |
| | Total | 27.8 | 47.4 | 5.2 | 19.6 | 479 |
| f) are most long-term? | Funding | 31.0 | 37.1 | 15.9 | 15.9 | 245 |
| | No funding | 21.4 | 37.6 | 17.9 | 23.1 | 234 |
| | Total | 26.3 | 37.4 | 16.9 | 19.4 | 479 |
| g) are most multidisciplinary? | Funding | 23.7 | 42.0 | 16.3 | 18.0 | 245 |
| | No funding | 9.4 | 45.5 | 19.7 | 25.3 | 233 |
| | Total | 16.7 | 43.7 | 18.0 | 21.5 | 478 |
| h) are most internationally oriented? | Funding | 31.1 | 46.7 | 7.4 | 14.8 | 244 |
| | No funding | 15.9 | 47.2 | 14.2 | 22.7 | 233 |
| | Total | 23.7 | 47.0 | 10.7 | 18.7 | 477 |

Source: Survey to FRIPRO applicants 2005-2007. Only applicants who indicated that FRIPRO had funded their research in the period 2005 to 2010 (question 8 in the form) were posed this question. 'Funding/no funding' in the table relate to the application they were asked about (question 2 in the form).

**Table 7.4 a) I had higher ambitions for this project than for my research funded by my own institution. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 34.2 | 12.6 | 32.0 | 2.9 | 9.0 | 9.4 | 278 |
| No funding | 31.9 | 17.8 | 24.0 | 1.6 | 9.0 | 15.7 | 433 |
| Total | 32.8 | 15.8 | 27.1 | 2.1 | 9.0 | 13.2 | 711 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.5 b) The project had a positive impact on my research career (e.g. new research position/promotion based on research resulting from the project). Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 45.1 | 24.2 | 17.7 | 3.2 | 6.1 | 3.6 | 277 |
| No funding | 29.6 | 17.6 | 21.2 | 4.0 | 8.2 | 19.3 | 425 |
| Total | 35.8 | 20.2 | 19.8 | 3.7 | 7.4 | 13.1 | 702 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.6** **c) The project led to some unexpected results of great importance to my research field. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 37.2 | 40.4 | 19.1 | 1.4 | 1.1 | .7 | 277 |
| No funding | 30.7 | 30.7 | 15.4 | .9 | 3.8 | 18.4 | 423 |
| Total | 33.3 | 34.6 | 16.9 | 1.1 | 2.7 | 11.4 | 700 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.7** **d) My research and innovation management skills have been significantly improved as a result of the project. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 30.7 | 35.7 | 26.7 | 4.7 | 1.4 | .7 | 277 |
| No funding | 22.2 | 27.2 | 25.3 | 2.6 | 4.1 | 18.6 | 419 |
| Total | 25.6 | 30.6 | 25.9 | 3.4 | 3.0 | 11.5 | 696 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.8** **e) The project has improved my department's reputation in Norwegian and international research communities. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 22.9 | 41.2 | 23.7 | 2.5 | .7 | 9.0 | 279 |
| No funding | 21.7 | 26.5 | 21.5 | 2.4 | 4.5 | 23.4 | 419 |
| Total | 22.2 | 32.4 | 22.3 | 2.4 | 3.0 | 17.6 | 698 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.9** **f) As a result of the project, my department has better opportunities for attracting research talents in my field of research. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 16.2 | 33.1 | 31.3 | 4.3 | 4.3 | 10.8 | 278 |
| No funding | 15.6 | 23.4 | 25.6 | 4.1 | 6.0 | 25.4 | 418 |
| Total | 15.8 | 27.3 | 27.9 | 4.2 | 5.3 | 19.5 | 696 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.10** **g) As a result of the project funding, my department is more able to prioritise new research areas. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 6.8 | 21.6 | 41.4 | 10.1 | 8.6 | 11.5 | 278 |
| No funding | 5.6 | 14.2 | 32.0 | 6.6 | 11.7 | 29.8 | 409 |
| Total | 6.1 | 17.2 | 35.8 | 8.0 | 10.5 | 22.4 | 687 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.11 h) Through the project new research areas of significant importance for our future research/innovation activities have been explored. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 38.9 | 39.6 | 15.3 | 2.5 | .4 | 3.3 | 275 |
| No funding | 25.5 | 31.4 | 14.8 | 2.4 | 5.6 | 20.2 | 411 |
| Total | 30.9 | 34.7 | 15.0 | 2.5 | 3.5 | 13.4 | 686 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.12 i) The project has changed my research activities towards larger collaborative projects. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 20.9 | 33.8 | 30.2 | 7.6 | 5.0 | 2.5 | 278 |
| No funding | 14.1 | 27.1 | 25.9 | 7.0 | 9.6 | 16.3 | 417 |
| Total | 16.8 | 29.8 | 27.6 | 7.2 | 7.8 | 10.8 | 695 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.13 j) The project has changed my way of doing research. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 8.7 | 30.1 | 38.8 | 10.9 | 10.1 | 1.4 | 276 |
| No funding | 7.2 | 20.0 | 33.9 | 7.9 | 14.4 | 16.6 | 416 |
| Total | 7.8 | 24.0 | 35.8 | 9.1 | 12.7 | 10.5 | 692 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.14 k) A new research group was established as a result of the project. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 19.0 | 24.1 | 22.3 | 6.2 | 25.2 | 3.3 | 274 |
| No funding | 14.2 | 18.8 | 20.5 | 4.6 | 25.8 | 16.1 | 415 |
| Total | 16.1 | 20.9 | 21.2 | 5.2 | 25.5 | 11.0 | 689 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.15 l) Long term international cooperation links have been considerably enhanced as a result of the project. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 45.5 | 30.3 | 15.2 | 3.2 | 4.3 | 1.4 | 277 |
| No funding | 27.6 | 24.0 | 19.7 | 4.8 | 8.4 | 15.4 | 416 |
| Total | 34.8 | 26.6 | 17.9 | 4.2 | 6.8 | 9.8 | 693 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.16 m) The project has led to or contributed to innovation (improved products, processes or organisational methods) . Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 12.3 | 19.2 | 30.4 | 5.1 | 22.5 | 10.5 | 276 |
| No funding | 12.7 | 15.3 | 23.8 | 4.9 | 19.0 | 24.3 | 411 |
| Total | 12.5 | 16.9 | 26.5 | 4.9 | 20.4 | 18.8 | 687 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.17 n) The project has contributed to solving social challenges (samfunnsutfordringer) . Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 7.6 | 16.0 | 27.3 | 4.4 | 29.8 | 14.9 | 275 |
| No funding | 5.3 | 13.5 | 23.9 | 4.3 | 24.6 | 28.3 | 414 |
| Total | 6.2 | 14.5 | 25.3 | 4.4 | 26.7 | 22.9 | 689 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.18 I was aware that internationalisation was among the assessment criteria. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 75.5 | 18.9 | 4.4 | .4 | .4 | .4 | 249 |
| No funding | 72.1 | 15.1 | 5.7 | 2.0 | 1.0 | 4.1 | 610 |
| Total | 73.1 | 16.2 | 5.4 | 1.5 | .8 | 3.0 | 859 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.19 The application was formulated to emphasise international cooperation in the project. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 58.2 | 27.7 | 9.2 | 3.2 | .8 | .8 | 249 |
| No funding | 57.8 | 21.0 | 9.0 | 3.4 | 3.9 | 4.8 | 609 |
| Total | 57.9 | 23.0 | 9.1 | 3.4 | 3.0 | 3.6 | 858 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.20 The project included more international collaboration than would be the case without this criterion. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 20.9 | 24.5 | 24.5 | 10.8 | 16.5 | 2.8 | 249 |
| No funding | 18.0 | 18.5 | 21.6 | 9.6 | 25.0 | 7.4 | 607 |
| Total | 18.8 | 20.2 | 22.4 | 9.9 | 22.5 | 6.1 | 856 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.21** **FRIPRO provide adequate support for international research collaboration. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 38.2 | 32.1 | 15.7 | 8.4 | 4.4 | 1.2 | 249 |
| No funding | 15.0 | 22.3 | 30.6 | 10.0 | 10.6 | 11.5 | 592 |
| Total | 21.9 | 25.2 | 26.2 | 9.5 | 8.8 | 8.4 | 841 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.22** **The FRIPRO scheme is useful in attracting foreign talents to Norway. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 21.0 | 25.4 | 27.0 | 9.7 | 6.0 | 10.9 | 248 |
| No funding | 7.6 | 15.4 | 38.6 | 12.7 | 9.3 | 16.4 | 591 |
| Total | 11.6 | 18.4 | 35.2 | 11.8 | 8.3 | 14.8 | 839 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.23** **FRIPRO provides adequate support for access to (and/or coordination of) international research infrastructures. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 13.3 | 29.0 | 31.9 | 8.5 | 7.3 | 10.1 | 248 |
| No funding | 6.6 | 12.8 | 39.6 | 11.9 | 9.9 | 19.2 | 588 |
| Total | 8.6 | 17.6 | 37.3 | 10.9 | 9.1 | 16.5 | 836 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.24** **Information on how the various RCN schemes may be used for internationalisation purposes is easily accessible. Per cent by funded and not funded FRIPRO applicants.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know | N |
|---|---|---|---|---|---|---|---|
| Funding | 10.5 | 23.9 | 41.7 | 10.9 | 6.9 | 6.1 | 247 |
| No funding | 6.7 | 11.4 | 42.8 | 17.1 | 7.8 | 14.2 | 586 |
| Total | 7.8 | 15.1 | 42.5 | 15.2 | 7.6 | 11.8 | 833 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.25 To what extent do you consider the following to be important purposes of the FRIPRO scheme? Per cent by funded and not funded FRIPRO applicants.**

| Purposes FRIPRO | Result of application | Highly important | Somewhat important | Less important | No opinion | N |
|---|---|---|---|---|---|---|
| High scientific quality | Funding | 95.7 | 4.3 | | | 258 |
| | No funding | 86.1 | 9.0 | 1.3 | 3.6 | 675 |
| | Total | 88.7 | 7.7 | 1.0 | 2.6 | 933 |
| Develop basic theory and methods | Funding | 55.0 | 36.8 | 6.2 | 1.9 | 258 |
| | No funding | 48.1 | 34.0 | 11.3 | 6.6 | 670 |
| | Total | 50.0 | 34.8 | 9.9 | 5.3 | 928 |
| Scientific renewal | Funding | 59.9 | 30.7 | 6.6 | 2.7 | 257 |
| | No funding | 54.4 | 29.9 | 8.2 | 7.5 | 669 |
| | Total | 55.9 | 30.1 | 7.8 | 6.2 | 926 |
| Research recruitment | Funding | 44.6 | 46.5 | 7.8 | 1.2 | 258 |
| | No funding | 35.6 | 42.9 | 15.6 | 5.8 | 671 |
| | Total | 38.1 | 43.9 | 13.5 | 4.5 | 929 |
| International cooperation | Funding | 47.3 | 41.5 | 10.5 | 0.8 | 258 |
| | No funding | 43.7 | 38.9 | 13.1 | 4.3 | 671 |
| | Total | 44.7 | 39.6 | 12.4 | 3.3 | 929 |
| Interdisciplinary collaboration | Funding | 20.1 | 41.3 | 35.9 | 2.7 | 259 |
| | No funding | 24.4 | 41.0 | 28.0 | 6.6 | 671 |
| | Total | 23.2 | 41.1 | 30.2 | 5.5 | 930 |
| Other objectives | Funding | 15.2 | 7.3 | 5.5 | 72.0 | 164 |
| | No funding | 15.5 | 6.0 | 6.0 | 72.6 | 419 |
| | Total | 15.4 | 6.3 | 5.8 | 72.4 | 583 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.26 How would you describe your own research/research group's objectives in terms of the following dimensions? Per cent by funded and not funded FRIPRO applicants.**

| Own objectives | Result of application | Always an Important Objective | Often an important objective | Sometimes an important objective | Never an important objective | N |
|---|---|---|---|---|---|---|
| High scientific quality | Funding | 94.6 | 5.4 | | | 259 |
| | No funding | 87.3 | 12.1 | 0.4 | 0.1 | 671 |
| | Total | 89.4 | 10.2 | 0.3 | 0.1 | 930 |
| Develop basic theory and methods | Funding | 44.6 | 39.5 | 15.5 | 0.4 | 258 |
| | No funding | 39.1 | 40.1 | 19.7 | 1.0 | 670 |
| | Total | 40.6 | 40.0 | 18.5 | 0.9 | 928 |
| Scientific renewal | Funding | 59.2 | 31.8 | 7.1 | 2.0 | 255 |
| | No funding | 47.5 | 40.5 | 10.0 | 1.9 | 667 |
| | Total | 50.8 | 38.1 | 9.2 | 2.0 | 922 |
| Research recruitment | Funding | 40.3 | 41.9 | 16.3 | 1.6 | 258 |
| | No funding | 37.3 | 38.2 | 22.3 | 2.2 | 668 |
| | Total | 38.1 | 39.2 | 20.6 | 2.1 | 926 |
| International cooperation | Funding | 54.9 | 35.8 | 8.2 | 1.2 | 257 |
| | No funding | 49.6 | 35.1 | 13.6 | 1.6 | 669 |
| | Total | 51.1 | 35.3 | 12.1 | 1.5 | 926 |
| Interdisciplinary collaboration | Funding | 27.2 | 35.0 | 31.5 | 6.2 | 257 |
| | No funding | 31.1 | 35.9 | 28.0 | 4.9 | 668 |
| | Total | 30.1 | 35.7 | 29.0 | 5.3 | 925 |

Source: Survey to FRIPRO applicants 2005-2007.

***** Chapter 5*****

**Table 7.27 FRIPRO support research for which there is no other RCN funding source. Survey replies by funded and non-funded applicants. Per cent.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Cannot say | N |
|---|---|---|---|---|---|---|---|
| Funding | 49.2 | 30.9 | 9.0 | 3.5 | 1.6 | 5.9 | 256 |
| No funding | 32.2 | 28.9 | 9.2 | 7.1 | 4.7 | 18.0 | 662 |
| Total | 36.9 | 29.4 | 9.2 | 6.1 | 3.8 | 14.6 | 918 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.28 FRIPRO is complementary to other RCN schemes in terms of the kinds of activities funded. Survey replies by funded and non-funded applicants. Per cent.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Cannot say | N |
|---|---|---|---|---|---|---|---|
| Funding | 27.9 | 36.0 | 14.7 | 7.0 | 4.7 | 9.7 | 258 |
| No funding | 16.6 | 29.0 | 18.3 | 10.4 | 4.1 | 21.5 | 661 |
| Total | 19.8 | 31.0 | 17.3 | 9.5 | 4.2 | 18.2 | 919 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.29 FRIPRO is complementary to other RCN schemes in terms of the size of the grants. Survey replies by funded and non-funded applicants. Per cent.**

| Result of application | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Cannot say | N |
|---|---|---|---|---|---|---|---|
| Funding | 14.5 | 24.6 | 24.6 | 9.8 | 8.6 | 18.0 | 256 |
| No funding | 5.7 | 18.4 | 23.4 | 12.8 | 8.8 | 30.8 | 662 |
| Total | 8.2 | 20.2 | 23.7 | 12.0 | 8.7 | 27.2 | 918 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.30 Opportunities offered for doing unique/original research? FRIPRO compared to other Norwegian funding sources, applicants' survey replies. Per cent.**

| Result of application | Better | About the same | Poorer | Cannot say | N |
|---|---|---|---|---|---|
| Funding | 56.3 | 23.6 | 6.3 | 13.8 | 254 |
| No funding | 26.7 | 25.7 | 18.7 | 28.9 | 641 |
| Total | 35.1 | 25.1 | 15.2 | 24.6 | 895 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.31 Opportunities offered for addressing high-risk topics? FRIPRO compared to other Norwegian funding sources, applicants' survey replies. Per cent.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 32.4 | 30.8 | 8.7 | 28.1 | 253 |
| No funding | 14.8 | 25.8 | 17.6 | 41.8 | 636 |
| Total | 19.8 | 27.2 | 15.1 | 37.9 | 889 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.32 Support for new projects without requiring preliminary research? (uten foreløpige forskningsresultater) FRIPRO compared to other Norwegian funding sources, applicants' survey replies. Per cent.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 16.3 | 44.2 | 12.0 | 27.5 | 251 |
| No funding | 5.5 | 26.3 | 25.7 | 42.5 | 638 |
| Total | 8.5 | 31.4 | 21.8 | 38.2 | 889 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.33 Opportunities offered for doing interdisciplinary research? FRIPRO compared to other Norwegian funding sources, applicants' survey replies. Per cent.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 16.9 | 52.4 | 5.9 | 24.8 | 254 |
| No funding | 5.8 | 34.4 | 18.2 | 41.5 | 636 |
| Total | 9.0 | 39.6 | 14.7 | 36.7 | 890 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.34 Opportunities offered for broadening your field of expertise? FRIPRO compared to other Norwegian funding sources, applicants' survey replies. Per cent.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 26.1 | 46.2 | 7.5 | 20.2 | 253 |
| No funding | 10.1 | 33.5 | 19.8 | 36.5 | 635 |
| Total | 14.6 | 37.2 | 16.3 | 31.9 | 888 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.35 Amount of funding? FRIPRO compared to other Norwegian funding sources, applicants' survey replies. Per cent.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 29.9 | 37.0 | 18.5 | 14.6 | 254 |
| No funding | 16.1 | 23.6 | 25.5 | 34.8 | 640 |
| Total | 20.0 | 27.4 | 23.5 | 29.1 | 894 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.36 Flexibility of use of funds? FRIPRO compared to other Norwegian funding sources, applicants' survey replies. Per cent.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 32.8 | 44.3 | 4.7 | 18.2 | 253 |
| No funding | 13.0 | 34.5 | 5.8 | 46.7 | 638 |
| Total | 18.6 | 37.3 | 5.5 | 38.6 | 891 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.37 Support for young scientists? FRIPRO compared to other Norwegian funding sources, applicants' survey replies. Per cent.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 21.3 | 50.0 | 5.9 | 22.8 | 254 |
| No funding | 6.6 | 30.7 | 18.7 | 44.0 | 638 |
| Total | 10.8 | 36.2 | 15.0 | 38.0 | 892 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.38 Impact on the prestige and career of the awarded investigators? FRIPRO compared to other Norwegian funding sources, applicants' survey replies. Per cent.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 35.0 | 37.8 | 4.3 | 22.8 | 254 |
| No funding | 25.6 | 28.3 | 5.0 | 41.0 | 636 |
| Total | 28.3 | 31.0 | 4.8 | 35.8 | 890 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.39 Opportunities for building new international scholarly networks? FRIPRO compared to other Norwegian funding sources, applicants' survey replies. Per cent.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 29.2 | 46.2 | 4.0 | 20.6 | 253 |
| No funding | 11.1 | 36.4 | 9.3 | 43.2 | 637 |
| Total | 16.3 | 39.2 | 7.8 | 36.7 | 890 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.40 Opportunities offered for doing unique/original research? FRIPRO compared to international funding sources, and ERC funding schemes in particular, applicants' survey replies.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 20.2 | 30.8 | 13.8 | 35.2 | 253 |
| No funding | 6.2 | 24.1 | 25.9 | 43.8 | 632 |
| Total | 10.2 | 26.0 | 22.5 | 41.4 | 885 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.41 Opportunities offered for addressing high-risk topics? FRIPRO compared to international funding sources, and ERC funding schemes in particular, applicants' survey replies.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 13.9 | 25.4 | 18.3 | 42.5 | 252 |
| No funding | 5.6 | 18.9 | 24.7 | 50.8 | 628 |
| Total | 8.0 | 20.8 | 22.8 | 48.4 | 880 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.42 Support for new projects without requiring preliminary research? FRIPRO compared to international funding sources, and ERC funding schemes in particular, applicants' survey replies.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 15.9 | 34.1 | 7.5 | 42.5 | 252 |
| No funding | 6.7 | 24.1 | 14.4 | 54.8 | 630 |
| Total | 9.3 | 27.0 | 12.5 | 51.2 | 882 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.43 Opportunities offered for doing interdisciplinary research? FRIPRO compared to international funding sources, and ERC funding schemes in particular, applicants' survey replies.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 5.5 | 39.1 | 9.1 | 46.2 | 253 |
| No funding | 2.2 | 26.9 | 17.7 | 53.1 | 631 |
| Total | 3.2 | 30.4 | 15.3 | 51.1 | 884 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.44 Opportunities offered for broadening your field of expertise? FRIPRO compared to international funding sources, and ERC funding schemes in particular, applicants' survey replies.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 9.9 | 42.1 | 8.3 | 39.7 | 252 |
| No funding | 4.0 | 27.8 | 17.8 | 50.5 | 630 |
| Total | 5.7 | 31.9 | 15.1 | 47.4 | 882 |

**Table 7.45 Amount of funding? FRIPRO compared to international funding sources, and ERC funding schemes in particular, applicants' survey replies.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 13.8 | 19.0 | 30.8 | 36.4 | 253 |
| No funding | 5.4 | 15.4 | 30.1 | 49.1 | 631 |
| Total | 7.8 | 16.4 | 30.3 | 45.5 | 884 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.46 Flexibility of use of funds? FRIPRO compared to international funding sources, and ERC funding schemes in particular, applicants' survey replies.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 28.5 | 26.9 | 5.5 | 39.1 | 253 |
| No funding | 13.0 | 19.7 | 9.7 | 57.7 | 631 |
| Total | 17.4 | 21.7 | 8.5 | 52.4 | 884 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.47 Support for young scientists? FRIPRO compared to international funding sources, and ERC funding schemes in particular, applicants' survey replies.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 10.3 | 36.9 | 10.3 | 42.5 | 252 |
| No funding | 4.1 | 23.0 | 17.4 | 55.5 | 631 |
| Total | 5.9 | 27.0 | 15.4 | 51.8 | 883 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.48 Impact on the prestige and career of the awarded investigators? FRIPRO compared to international funding sources, and ERC funding schemes in particular, applicants' survey replies.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 7.1 | 26.1 | 30.8 | 36.0 | 253 |
| No funding | 3.5 | 15.4 | 32.0 | 49.0 | 628 |
| Total | 4.5 | 18.5 | 31.7 | 45.3 | 881 |

Source: Survey to FRIPRO applicants 2005-2007.

**Table 7.49 Opportunities for building new international scholarly networks? FRIPRO compared to international funding sources, and ERC funding schemes in particular, applicants' survey replies.**

| Result of application | Better | About the same | Poorer | Cannot say | Total |
|---|---|---|---|---|---|
| Funding | 6.7 | 36.9 | 21.0 | 35.3 | 252 |
| No funding | 2.2 | 21.0 | 27.8 | 49.0 | 629 |
| Total | 3.5 | 25.5 | 25.9 | 45.1 | 881 |

Source: Survey to FRIPRO applicants 2005-2007.

# Appendix 3 Informant list

### Chairs of FRIPRO expert committees and RCN employees

- Sameline Grimsgaard, University Hospital of North Norway, Chair FRIMEDBIO
- Geir Anton Johansen, University of Bergen, Chair FRINATEK
- May-Brith Ohman Nielsen, University of Agder, Chair FRIHUM
- Odd Nordhaug, Norwegian School of Economics, Chair FRISAM
- Christin Krokene, The Research Council of Norway
- Øyvind Pettersen, The Research Council of Norway
- Rune Rambæk Schiølberg, The Research Council of Norway
- Siri Tønseth, The Research Council of Norway

### FRIPRO applicants

- Gunnar Bratbak, University of Oslo
- Svein Olaf Dahl, University of Bergen
- Ingrid Susann Gribbestad, Norwegian University of Science and Technology
- Trygve Ulf Helgaker, University of Oslo
- Robert Jenssen, University of Tromsø
- Håvard Kauserud, University of Oslo
- Elisabeth Kvaavik, University of Oslo

### Leaders at relevant research institutions

- Knut Helland, University of Bergen
- Dag Jenssen, Oslo and Akershus University College of Applied Sciences
- Ellen Mortensen, University of Bergen
- Per Magnus, Norwegian Institute of Public Health
- Ottar Mæstad, Chr. Michelsen Institute
- Endre Mørck, University of Tromsø
- Ole Ringdal, University of Stavanger
- Einar Sagstuen, University of Oslo
- Are Aastveit, Norwegian University of Life Sciences

# Appendix 4 Questionnaire to FRIPRO applicants

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## Project confirmation

This survey addresses researchers who have applied for independent projects (FRIPRO-projects) financed by the Research Council of Norway (RCN). The experiences of both successful and unsuccessful applicants are of great value to the ongoing evaluation and possible restructuring of the FRIPRO scheme.

The questionnaire relates to your FRIPRO application 2005/2006/2007 listed below. We appreciate your responses about your experience and views on the FRIPRO application process, the FRIPRO-funding scheme, as well as relevant alternative funding schemes. First, we would like you to confirm some basic information about your FRIPRO application so we can direct you to the relevant questions.

**Application and fundning:** Prefilleded information based on FRIPRO administrative reccords, to be verified by respondent below

1. Please confirm that the information in question 2, 3 and 4 below is correct. In case you were not the principal investigator of the project, please type in the correct information in the box below.

   Yes, the prefilled project infomation below is correct or has been corrected by me

   I cannot say; the principal investigator (prosjektleder) for the specified FRIPRO project was (please fill in name and e-mail-address):

2. FRIPRO application/ project name:

3. Year of application:

4. FRIPRO funding of application:

   No funding  Funding

   Here you may enter relevant information about the FRIPRO-application/project

5. To avoid answering the entire questionnaire for multiple FRIPRO applications, please select the correct category below.

   I have received this questionnaire only and can answer for the application specified above

   I have received multiple questionnaires and want to complete the entire questionnaire for the application specified above.

   I have already completed the entire questionnaire for another application (when you select this option, you will be directed to the application specific questions and skip all general questions, i.e. your opinions about the FRIPRO scheme and objectives).

   I don't know this application (when you select this option you are excluded from the repondent group, you will be directed to the last page of the survey, then please select "avslutt")

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6. Please indicate the number of researchers who participated in the project. (If no part of the project was implemented, indicate the number of researchers listed in the project application).

| | Number of people in recruitment positions (PhDs/postdocs) | Number of senior and other staff |
|---|---|---|
| Own organisation | | |
| External partner organisations | | |

7. Please indicate your approximate number of applications to the Research Council of Norway (RCN) between 2005 and 2010 (only include applications with you as principal investigator/project leader).

| | |
|---|---|
| Total number of FRIPRO applications | |
| Total number of other RCN applications | |

8. Please indicate the kinds of RCN schemes which have funded your research in the period 2005-2010:

| | Yes | No |
|---|---|---|
| FRIPRO-grants (Fri prosjektstøtte) | | |
| Large scale programmes (Store programmer) | | |
| Basic research programmes (Grunnforskningsprogrammer) | | |
| User-directed innovation programmes (Brukerstyrte programmer) | | |
| Centre of Excellence (SFF) or Centre of Research-based innovation (SFI) or FME | | |
| Policy-oriented programmes (Handlingsrettede programmer) | | |
| Networking measures (courses, conferences, events, awards, network agreements, collaborative measures or international networking | | |
| Other RCN funding | | |

Other RCN funding, please specify

9. Please give an estimate of how your research was financed by other sources than your own institution in 2011 (insttusjonens grunnfinansiering). Has the share decreased or increased since 2005?

| | Proportion 2011 | | | |
|---|---|---|---|---|
| | % | Decreased | Unchanged | Increased |
| External funding | | | | |

10. Please indicate your main external (other than own institution) funding source(s) for research projects since 2005

RCN
Other Norwegian sources
International sources
None

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## FRIPRO application process: information and contact with RCN

11. Considering your FRIPRO application(s) in general, to what extent were the following RCN (funding) processes satisfactory?

| | 5 To a great extent | 4 | 3 | 2 | 1 Not at all | Cannot say |
|---|---|---|---|---|---|---|
| Access to relevant background information for the call (utlysningen) | | | | | | |
| Clarity and easy to understand information about the call (utlysningen) | | | | | | |
| User-friendliness of the online application system | | | | | | |
| Support during the application process | | | | | | |
| The types of applications and size of projects accepted (in the call for applications) | | | | | | |
| The competence of the review committee (fagkomiteen) | | | | | | |
| Transparency regarding funding decisions | | | | | | |
| Clarity and completeness of the feedback to applicants | | | | | | |
| The overall cost efficiency of the application process | | | | | | |
| User-friendliness of the reporting system (framdrifts- og sluttrapporteringssystem) | | | | | | |

12. To what degree do you think the FRIPRO review panel/individual reviewers that assessed your application:

| | 5 To a great extent | 4 | 3 | 2 | 1 Not at all | Cannot say |
|---|---|---|---|---|---|---|
| Was able to assess all the fields of research involved in the application? | | | | | | |
| Provided an impartial and unbiased assessment of your application? | | | | | | |
| Provided a thorough assessment of your application? | | | | | | |

If you have comments concerning obstacles or needs for improvements in the terms for applications, or the review process, please use the free text section below

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## FRIPRO objectives

13. To what extent do you consider the following to be important purposes of the FRIPRO scheme?

| | Highly important | Somewhat important | Less important | No opinion |
|---|---|---|---|---|
| High scientific quality | | | | |
| Develop basic theory and methods | | | | |
| Scientific renewal | | | | |
| Research recruitment | | | | |
| International cooperation | | | | |
| Interdisciplinary collaboration | | | | |
| Other objectives (please specify below) | | | | |

14. How would you describe your own research/research group's objectives in terms of the following dimensions:

| | Always an important objective | Often an important objective | Sometimes an important objective | Never an important objective |
|---|---|---|---|---|
| High scientific quality | | | | |
| Develop basic theory and methods | | | | |
| Scientific renewal | | | | |
| Research recruitment | | | | |
| International cooperation | | | | |
| Interdisciplinary collaboration | | | | |

15. How do you regard the complementarity and task division between the FRIPRO scheme and other* RCN research support schemes?
* e.g. research programmes, infrastructural and institutional measures (centre schemes, funding for scientific equipment/databases, basic funding to research institutes).

| | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Cannot say |
|---|---|---|---|---|---|---|
| FRIPRO support research for which there is no other RCN funding source | | | | | | |
| FRIPRO is complementary to other RCN schemes in terms of the kinds of activities funded | | | | | | |
| FRIPRO is complementary to other RCN schemes in terms of the size of the grants | | | | | | |

If you think the complementarity needs to be improved, please elaborate in the free text section below (e.g. if there are funding needs that are not covered by any RCN scheme, or schemes that should be better coordinated to avoid overlap)

16. In your opinion, to what degree does the FRIPRO scheme have the appropriate policies and review processes to:

| | 5 To a high degree | 4 | 3 | 2 | 1 Not at all | Cannot say |
|---|---|---|---|---|---|---|
| Support the most promising and important research (in your field of research)? | | | | | | |
| Facilitate interdisciplinary research? | | | | | | |
| Support high-risk research? | | | | | | |
| Support well-founded and solid research? | | | | | | |
| Support original and ground breaking research? | | | | | | |
| Assess the potentials of young scientists/select the best talents? | | | | | | |

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## FRIPRO Funding outcome of your FRIPRO-application

17. Are you aware of other funding sources which would have been relevant for the project you applied to FRIPRO for?

| | Yes | No |
|---|---|---|
| Other Norwegian funding sources | | |
| International funding sources | | |

18. Please estimate what proportion of the total project cost was covered by FRIPRO funding, by other external funds, and by internal/institutional funds (if you are not able to give an estimate, leave blank).

| | % of total project cost |
|---|---|
| FRIPRO funding | |
| Other external funds | |
| Internal/institutional funds | |
| Total | 100% |

19. To what extent did the FRIPRO funding enable you to successfully compete for funding from other external sources?

| | 5 To a high degree | 4 | 3 | 2 | 1 Not at all | Cannot say |
|---|---|---|---|---|---|---|
| Resulted in additional Norwegian funding | | | | | | |
| Resulted in additional international funding | | | | | | |

20. Was your original FRIPRO application later (revised and) resubmitted to FRIPRO or submitted to other funding schemes?

Yes
No

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21. To what scheme(s) was your application later submitted/resubmitted to and what was the outcome?

| | Submitted, but no funding | Submitted and received funding | Submitted and still pending |
|---|---|---|---|
| RCN FRIPRO-grants (Fri prosjektstøtte) | | | |
| RCN Large scale programmes (Store programmer) | | | |
| RCN Basic research programmes (Grunnforskningsprogrammer) | | | |
| RCN User-directed innovation programmes (Brukerstyrte programmer) | | | |
| RCN Centre of Excellence (SFF) or Centre of Research-based innovation (SFI) or FME | | | |
| RCN Policy-oriented programmes (Handlingsrettede programmer) | | | |
| RCN Networking measures (courses, conferences, events, awards, network agreements, collaborative measures or international networking measures) | | | |
| | Submitted, but no funding | Submitted and recieved funding | Submitted and still pending |
| FP 7 Ideas (European Research Council) | | | |
| Other parts of FP7 or FP 6 | | | |
| Other (please specify below) | | | |

Other, please specify

22. Please indicate the total funding resulting from resubmitting the application:

- Received no funding
- Received the same or simular to the sum requested in the original FRIPRO application
- Received more funding than the sum in the original FRIPRO application
- Received less funding than the sum in the original FRIPRO application
- Don't remember

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## Role of FRIPRO compared to other research funding schemes nationally/internationally

23. Was the project you proposed implemented/performed without external funding?

Yes
Partly
No

24. Comparing FRIPRO with alternative Norwegian funding sources, is FRIPRO poorer, about the same or better concerning:

| | Better | About the same | Poorer | Cannot say |
|---|---|---|---|---|
| Opportunities offered for doing unique/original research? | | | | |
| Opportunities offered for addressing high-risk topics? | | | | |
| Support for new projects without requiring preliminary research? (uten foreløpige forskningsresultater) | | | | |
| Opportunities offered for doing interdisciplinary research? | | | | |
| Opportunities offered for broadening your field of expertise? | | | | |
| Amount of funding? | | | | |
| Flexibility of use of funds? | | | | |
| Support for young scientists? | | | | |
| Impact on the prestige and career of the awarded investigators? | | | | |
| Opportunities for building new international scholarly networks? | | | | |

25. Comparing FRIPRO with alternative international funding sources, and ERC funding schemes in particular, is FRIPRO poorer, about the same or better concerning:

| | Better | About the same | Poorer | Cannot say |
|---|---|---|---|---|
| Opportunities offered for doing unique/original research? | | | | |
| Opportunities offered for addressing high-risk topics? | | | | |
| Support for new projects without requiring preliminary research? (uten foreløpige forskningsresultater) | | | | |
| Opportunities offered for doing interdisciplinary research? | | | | |
| Opportunities offered for broadening your field of expertise? | | | | |
| Amount of funding? | | | | |
| Flexibility of use of funds? | | | | |
| Support for young scientists? | | | | |
| Impact on the prestige and career of the awarded investigators? | | | | |
| Opportunities for building new international scholarly networks? | | | | |

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**FRIPRO PI Survey Questionnaire**

**Project results**

26. Please indicate the number of PhDs and postdocs resulting from the project

| | Number |
|---|---|
| Completed PhDs | |
| PhDs in progress | |
| Ended postdocs | |
| Postdocs in progress | |

27. Please indicate the number of peer-reviewed scientific publications which are a direct result of the project.

Include both those authored by you and those authored by other project group members. Publication that were mainly funded by other sources should not be included. PhD theses should not be included (these will be calculated based on answers to the previous question), but separately published papers by those working on PhDs which also are expected to be/are part of a thesis should be included.

| | |
|---|---|
| Number of articles/book chapters (peer reviewed and published) | |
| Number of books/monographies (peer reviewed and published) | |

28. To what extent do you agree with the following statements? Please answer for the specific project.

| | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don?t know |
|---|---|---|---|---|---|---|
| a) I had higher ambitions for this project than for my research funded by my own institution | | | | | | |
| b) The project had a positive impact on my research career (e.g. new research position/promotion based on research resulting from the project) | | | | | | |
| c) The project led to some unexpected results of great importance to my research field | | | | | | |
| d) My research and innovation management skills have been significantly improved as a result of the project | | | | | | |
| e) The project has improved my department?s reputation in Norwegian and international research communities | | | | | | |
| f) As a result of the project, my department has better opportunities for attracting research talents in my field of research | | | | | | |
| g) As a result of the project funding, my department is more able to prioritise new research areas | | | | | | |
| h) Through the project new research areas of significant importance for our future research/innovation activities have been explored | | | | | | |

| | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don't know |
|---|---|---|---|---|---|---|
| i) The project has changed my research activities towards larger collaborative projects | | | | | | |
| j) The project has changed my way of doing research | | | | | | |
| k) A new research group was established as a result of the project | | | | | | |
| l) Long term international cooperation links have been considerably enhanced as a result of the project | | | | | | |
| m) The project has led to or contributed to innovation (improved products, processes or organisational methods) | | | | | | |
| n) The project has contributed to solving social challenges (samfunnsutfordringer) | | | | | | |

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29. Please compare the nature of your most recent FRIPRO project with your other R&D projects (forsknings- og utviklingsprosjekter) - and indicate which projects...

| | The FRIPRO project | No difference | My other projects | Cannot say/NA |
|---|---|---|---|---|
| a) are most strategically important to your organisation? | | | | |
| b) are most oriented towards basic research? | | | | |
| c) provide most new scientific results? | | | | |
| d) are most scientifically/technologically risky? | | | | |
| e) have the highest scientific quality? | | | | |
| f) are most long-term? | | | | |
| g) are most multidisciplinary? | | | | |
| h) are most internationally oriented? | | | | |

30. When assessing applications under the FRIPRO scheme, importance is attached to whether projects incorporate plans for international research cooperation. Considering your most recent FRIPRO application, to what extent do you agree or disagree with the following statements about this criteria:

| | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Don?t know |
|---|---|---|---|---|---|---|
| I was aware that internationalisation was among the assessment criteria | | | | | | |
| The application was formulated to emphasise international cooperation in the project | | | | | | |
| The project included more international collaboration than would be the case without this criterion | | | | | | |

31. To what extent do you agree with the following statements about support for the internationalisation of research?

| | Fully agree | Partly agree | Neither agree nor disagree | Partly disagree | Fully disagree | Not relevant |
|---|---|---|---|---|---|---|
| FRIPRO provide adequate support for international research collaboration | | | | | | |
| The FRIPRO scheme is useful in attracting foreign talents to Norway | | | | | | |
| FRIPRO provides adequate support for access to (and/or coordination of) international research infrastructures | | | | | | |
| Information on how the various RCN schemes may be used for internationalisation purposes is easily accessible | | | | | | |

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32. What is your current position?

Select Position

33. Your age and gender:

Female
Male

34. Please indicate your (main) current institutional affiliation

Select institutional category

Other (please specify)

35. Please state your area of research

Medicine (all types)
Technological disciplines/engineering
Humanities (incl. theology)
Centre, group, institute etc. with high degree of cross-disciplinarity
Mathematics/natural science
Agriculture/fishery-related fields
Social science (incl. law)
Other

36. International co-operation: Indicate the share of your research that are carried out in co-operation with researchers from other countries:

Percentage

37. Considering your research projects the past 5 years (that you led or took part in), how many researchers at your institution usually participate in these projects (including doctoral students)?

Average number of (local) group members

38. Other comments:
Please feel free to give your comments below concerning your overall FRIPRO experience, the scheme's challenges and areas for improvement (or comments about this survey).

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