

Evaluation of the Danish Council for Independent Research

Report of the Evaluation Panel

Research and Innovation: Analysis and Evaluation 17/2014



Ministry of Higher Education
and Science

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Preface by the Minister for Higher Education and Science

The Danish Council for Independent Research (DFF) has been a key institution in the Danish research funding landscape for the past ten years. By funding bottom-up independent research projects and providing support for young researchers, DFF has been a cornerstone of many researchers' careers.

Last year the Danish National Research Foundation was evaluated, and this year three former Danish research and innovation councils merged to form the Innovation Fund Denmark. In light of this, it was decided to carry out this evaluation of DFF.

The evaluation clearly shows that DFF fulfils its role very successfully. DFF supports the brightest minds and most talented young researchers while maintaining the highest respect and appreciation throughout the Danish research landscape. This is very impressive.

I am convinced that DFF contributes to the high performance of Danish research. DFF is the stepping stone for talented young researchers, who are given a chance to embark on a research career. And the council is open to researchers' own ideas that may be risky, but can lead to genuine breakthroughs that provide important new knowledge and solutions to our society's challenges.

Even so, I also take notice of the many useful recommendations made by the panel. For instance, as it is pointed out, there is clearly room for improving the gender balance in Danish research. Female researchers are still markedly underrepresented, especially in senior level research positions. This means that we are missing out on both talent and excellent research ideas, which is an issue that we must take very seriously.

Like the panel I too consider internationalisation to be an opportunity which should be seized by all the Danish researchers. International collaboration and researcher mobility are crucial elements in developing and strengthening Danish research and its results, and DFF is an important institution in this regard.

The recommendations of this evaluation report are not met overnight and they will require active participation from many stakeholders. But I feel confident that we are on the right path, and I look forward to the continued dialogue on these important questions.

In conclusion, I would like to express my sincere gratitude to the panel for taking on the task of evaluating the research council.

Sofie Carsten Nielsen
Minister for Higher Education and Science

Preface by the Chairman of the Evaluation Panel

The quality of research-based expertise and the accessibility of new knowledge generated anywhere in the world are decisive for the future well-being of society as it seeks to meet a wide array of different challenges in a rapidly changing world. In this respect the most successful form of knowledge transfer lies in the training of excellently qualified researchers who can take over leading functions in science and scholarship, in business, and in wider sectors of society. The provision of a continual flow of highly-qualified researchers, who have been trained on the basis of a competitive grant system, into other domains is by far the best means for the transfer of expertise from universities and other research organisations to society at large.

At a time when the generation of new knowledge and expertise is progressively accelerating, institutional structures and the processes operating within them must not only recognise the requirement for continual adaptation but also establish the necessary organisational structures. Ultimately, they must be prepared to take on new challenges and advance new research areas in exchange with the respective communities to ensure that themes of future significance are supported early on.

Against this background, the Evaluation Panel has explored the efficiency and effectiveness of the Danish research system with particular emphasis on universities and the Danish Council for Independent Research (DFF): Both have a central role to play in linking research and research-based training with the highest international quality standards. It makes them essential for the well-functioning of the entire system. All other stakeholders must ultimately place reliance on DFF and the universities in providing them with the next generation of well-trained experts and researchers, as stewards of their disciplines and, indeed, as partners for collaboration in various areas of society.

The Evaluation Panel recognises that DFF in many of its activities is to be seen as a crucial part of the Danish research system. Proposals accepted by DFF are appreciated throughout Denmark to meet the highest standards. In particular for postdoctoral researchers, they often provide a 'quality stamp' which considerably enhances their career prospects. Empirical evidence, also resulting from a bibliometric study, further underpins the crucial importance of DFF support for ensuring scientific and scholarly excellence throughout the Danish research and innovation system.

The Evaluation Panel's recommendations are designed to improve DFF's already very successful mode of operation even further. It strongly advises the Danish Parliament to enable DFF to continue on its path of supporting high-level, internationally recognised research activities by way of a longer term guaranteed financial framework and, if possible, with increased resources. This seems necessary as DFF sets about its task to gain and retain research talent for Denmark, as well as to pay attention to future challenges for a dynamically evolving knowledge-driven society.

As Chairman of the Evaluation Panel I would like to express my sincere thanks to my colleagues Suzanne Fortier, Christoph Kratky, Maria Nedeva, Peter Nijkamp, and Andreas Seidel-Morgenstern, as well as to Jonas Burgheim who served as our academic secretary. Furthermore, I am extremely grateful to all the researchers, representatives of universities, other research organisations, industry, and private foundations, the board members and the secretariat of DFF, as well as the Minister and the staff members of the Danish Ministry for Higher Education and Science for their readiness to support us throughout the process, and for their openness in the discussions we had. It has been a delight to work with all of them.

Wilhelm Krull
Chairman of the Evaluation Panel

Executive Summary

Since its formal establishment in 2004, the Danish Council for Independent Research (DFF) has been playing a key role in the Danish research funding system. By providing basic research funding for projects and fellowships it contributes to ensuring a continual flow of well-trained and highly-qualified researchers among and between the different stakeholders in universities, in industry and the service economy, as well as in wider sectors of society.

The evaluation of DFF focused on and was mainly concerned with its role and function within the Danish research ecosystem, the evolution of its funding instruments, the appropriateness of its selection processes, the interaction with universities and other stakeholders, as well as governance, organisational structures, and the management of DFF.

- All in all, DFF is widely recognised and highly accepted as a guarantor of internationally acknowledged high quality research funding. It serves as an important catalyst of academic success and particularly helps some of the most promising research talents to further develop their careers.
- DFF should remain an independent funding body. It should not be merged with the Danish National Research Foundation (DNRF).
- DFF should be provided with sufficient funds to secure the health and development of the Danish research system. In order to fulfil the tasks recommended by the Panel, the funding allocated to DFF should move beyond its current phase of stagnation.
- A review of the duration of funding periods should generally be considered. Longer-term funding for a period of up to five years can favour more risk-taking just like it can allow for researchers to pursue their respective projects in a focused manner without the detraction caused by the preparation of new funding proposals at short intervals.
- Early stage mobility is considered an important precondition for research success. In view of the available data and the researchers' statements, the overall level of mobility within the Danish research environment (nationally and internationally) appears to be relatively low. This should be counteracted by strengthening the existing MOBILEX programme and by introducing stronger and more flexible mobility incentives as part of the other funding instruments provided by DFF.
- The gender ratio in Danish research does not live up to reasonable expectations. This holds true in particular for senior level research positions. With regard to the development of female participation in higher education and research, a scissor diagram can be observed, encapsulating the fact that from the first entry into tertiary education up to higher level positions in academia the ratio of female and male representation is reversed. Stronger, more flexible, and better integrated support for female researchers is strongly recommended at all levels of DFF funding and in the Danish research system at large.

- Across Europe one of the major challenges for universities is to provide and maintain the infrastructure required for highest level research projects. Universities cannot be expected to carry the sole responsibility for infrastructure costs. They should rather be supported by other public funding sources and, in particular, bodies like DFF, Innovation Fund Denmark (IFD) or DNRF as well as the funds allocated by the Minister upon the recommendation by the National Committee for Research Infrastructure (NUFI).
- The DFF Secretariat is currently based within the Ministry of Higher Education and Science. This combined with the Minister's authority inter alia with regard to the appointment of members of the subject-specific councils and the Board could lead to a problematic closeness between the Ministry and DFF. A Memorandum of Understanding between the Danish Agency for Science, Technology and Innovation (DASTI) and DFF to this effect has entered into force on 1 April 2014, which is a good step in the right direction. An even more clearly defined distance between the two organisations and the possibility for complete disintegration should be seriously considered in the future. Related communication activities by DFF could contribute to an accrued institutional identity which would be desirable and could only benefit its role and its cause in which autonomy is closely linked to credibility.
- The interface between the five subject-specific councils gathered under the DFF umbrella ought to be improved. New devices and processes to address the challenge of appropriately allocating and treating cross-disciplinary research proposals should be developed by the Board on top of the existing mechanisms. The 'matrix committee' for inter-disciplinary selection is a first constructive step to address this challenge. Further steps could be a more dynamic attribution of resources to the respective council and/or a more extensive use of review panels with multi-disciplinary representation.
- Several stakeholders expressed their concern that there could be a correlation between the institutional affiliation of the subject-specific council members and the share of grants provided to respective universities. This would have a strong negative effect on the legitimacy of DFF and measures to correct it should be introduced. The Panel believes that one such measure is to ensure a good representation of researchers from all Danish universities and to avoid the provision of more than a maximum of two subject-specific council chairs per university at a time. Nevertheless, outstanding scientific competence has to remain the main criterion for selection.

In order to enable DFF to continue its very successful operations, the Panel strongly recommends the Danish Parliament to provide reliable long-term and, if possible, increased funding for DFF.

1. Introduction

With the Danish Council for Independent Research (DFF) Denmark can rely on a well-established funding and advisory council as part of a diverse landscape of funding institutions for research and innovation. DFF was formally established in 2004. Since then DFF has funded research in providing overall close to DKK 15 billion (EUR 2 billion) in support of research projects. The institution is governed by a Board of Directors ('Board') and consists of a total of five 'subject-specific research councils' composed of accomplished researchers from the respective fields. As part of a recent re-alignment of the Danish national research and innovation funding structures, DFF has also been subject to structural review. According to the political agreement that "on the basis of the evaluation of the Danish National Research Foundation (DNRF)¹ and the evaluation of the Danish Council for Independent Research the political parties will be invited for discussions on the overall organisation of research in this area"², the report is to serve as a basis for further political considerations and structural developments.

1.1. Terms of Reference and Methodology of the Evaluation

An international evaluation panel has been mandated by the Minister for Higher Education and Science based on political agreements from October 3, 2013 and October 31, 2013, on Innovation Fund Denmark (IFD) and the allocation of the Danish Research Reserve respectively. The panel has been selected to be composed of six international experts with broad professional backgrounds and competences in the fields of international management and strategic planning, notably funding, in and by research institutions. The panel members from Europe and North America include internationally acknowledged researchers, research funding executives, and members of national and international funding bodies and organisations.

The purpose of the evaluation process is to critically consider the structure, functioning, and results of DFF's funding and advisory contribution to the Danish research landscape. The evaluation shall in particular focus on:

- The structure and the organization of DFF;
- The research output and the quality of research output (bibliometric analysis) based on the funding granted by DFF alone or in collaboration with other funding bodies;
- DFF's contribution to an enhanced career development of research talents and the general research base in Denmark;
- DFF's contribution to international collaboration, international co-publications, and other aspects of DFF's internationalisation strategy for the Danish research environment;

1 The report for the Evaluation of the Danish National Research Foundation (DNRF) was published in fall 2013.

2 See political agreement on 'Danmarks Innovationsfond', 3 October 2013.

- The funding instruments of DFF and their coherence with other funding instruments in the Danish and European research and innovation system.

The evaluation is directed towards three target groups. The first target group is composed of representatives of the political system and the general public; both will be informed about the results of the evaluation. Considerations can be conducted whether or not the structure and role of DFF are fulfilling relevant criteria of efficiency and effectiveness in the designated way. The second addressee of the evaluation is DFF itself; it should make use of the results to further adjust and improve funding and advisory roles just like to develop clear-cut future priorities. The third and final target group for the evaluation is composed of the affected research institutes and universities which shall be in a position to make use of the results of the evaluation laid out in this report for their future strategy, policy concepts, and further development.

In its scope, the evaluation addresses DFF's structure and *modi operandi* and the funding allocated by it in support of independent research. The evaluation furthermore focuses on the structure and working procedures in place for and conducted by DFF. Previous reports and evaluations also have been considered, some of them being referenced in the present evaluation report.

For the data collection various other methods like desk studies, a self-assessment by DFF, qualitative interviews, questionnaire surveys, bibliometric analyses, and special requests of data by the evaluation panel towards DFF have also been applied and conducted. The panel provides its description, analysis, assessments, and conclusions in this report with its recommendations as a cumulative synthesis and result of its evaluation.

2. The (New) Danish Research Landscape

Denmark's well-functioning research and innovation system must ensure a continual flow of highly-qualified researchers among and between the different stakeholders involved in basic research, scientific and technological development, as well as in product and service innovations. In view of the increasing speed of knowledge generation and accelerating cycles of innovation, it is not only necessary to recognise the requirement for adjustments and adaptations but also to establish appropriate organisational structures.

With the entry into force of the new "Act on research consulting, etc."³, the Danish research funding landscape has been subject to considerable re-adjustments and changes to its structure and form with the changes being implemented as of 1 April 2014. In the former system three independent organisations with both funding and advisory roles had been responsible for the promotion of strategic as well as applied research and innovation. The Danish Council for Strategic Research (DSF) supported both basic and applied research in fields of political priority. The aim of the Danish National Advanced Technology Foundation (HTF) was to create growth and employment in Denmark by supporting activities that transfer knowledge from Danish research institutions to the Danish business community. Collaborations had to involve at least one public research institution and at least one private company. The Danish Council for Technology and Innovation (RTI) was both an advisory body to the Minister for Higher Education and Science about technology and innovation policy and an administrative body for initiatives handed to the council by the Minister. These initiatives particularly aimed at the promotion of innovation and dissemination of knowledge between knowledge institutions and enterprises.⁴

These activities have been merged and combined in one Innovation Fund Denmark (IFD). IFD is expected to have an annual budget of approximately DKK 1.5 billion (EUR 213 million) in 2014, and it is thus set to surpass DFF with regard to the available funds for support and advice by more than EUR 50 million. IFD has the competence to provide "high level independent expert advice on research, and is responsible for ensuring that the advice incorporates relevant national and international experience and developments."⁵

The revised legislation also brought about a unified Danish Council for Research and Innovation Policy with the objective "to promote the development of Danish *research*, *technology*, and *innovation* for the benefit of society as a whole."⁶ This broad scope of activity is described more narrowly in its task to provide the Minister for Higher Educa-

3 Act on research consulting, etc. (consolidated act no. 1064 of 6 September 2010) in its amended version incorporating the changes introduced by section 4 of act no. 623 of 12 June 2013, and section 1 of act no. 310 of 29 March 2014.

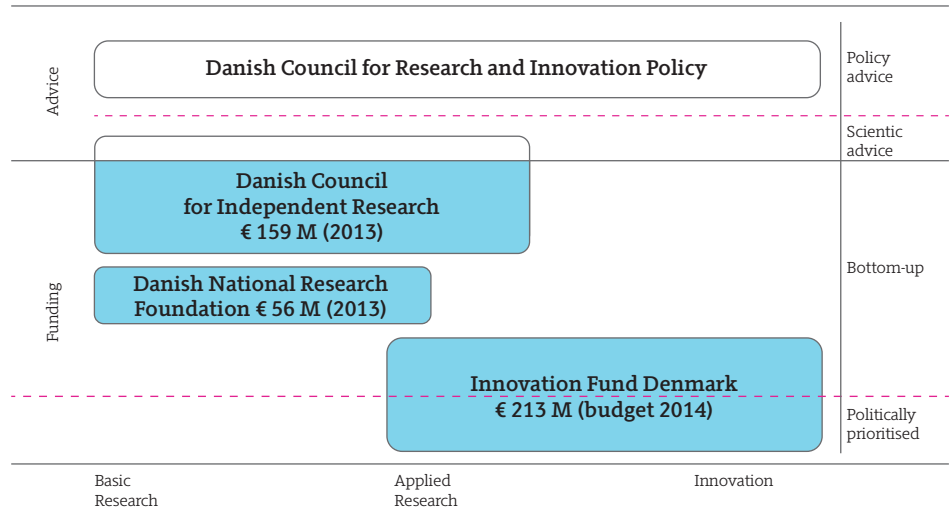
4 Cf. Evaluation of the Danish National Research Foundation (DNRF), report 2013, for further details.

5 Act on research consulting, etc., part 3, art. 3, para 1.

6 Act on research consulting, etc., part 1, art. 1, para 3.

tion and Science, the Danish parliament and all government ministers “with high-level, independent expert advice”.⁷ This new institution for advice on research and innovation policy is replacing the previous Danish Council for Research Policy as an overarching advisory body on all *research policy* matters.⁸

Figure 2.1
Research and Innovation system 2014



Source: The Danish Agency for Science, Technology and Innovation

In contrast, the Danish Council for Independent Research (DFF) fulfils two roles: the DFF “awards *grants* and provides *advice on research*”.⁹ The two main purposes of the Council are to support tangible research initiatives based on researchers’ own initiatives (1) and to provide advice on research associated with these initiatives (2).¹⁰

A review in parallel to the restructuring process of the innovation support bodies creating one general funding column each for the fields of basic research and innovation (applied research) was previously considered by some political actors. As part of the political process which preceded the legislative amendments it was decided that subsequent to the evaluations of the Danish National Research Foundation (DNRF) and DFF there would be further political consideration and discussion on the organisation of the range and structure of funding mechanisms for fundamental research. At least until that point in time the established dual structure for basic and independent research will remain in place while introducing some amendments to the overall ‘landscape’ and the scope of activities of the respective bodies. This decision corresponded with the relevant recommendations from an external evaluation process conducted by an international panel of experts for the DNRF in 2013 of which the report was

7 Ibid, paras 3 and 4; for more information go to: <http://ufm.dk/en/research-and-innovation/councils-and-commissions/the-danish-council-for-research-and-innovation-policy>.

8 For more information on the former Danish Council for Policy Advice go to: <http://ufm.dk/en/research-and-innovation/councils-and-commissions/the-danish-council-for-research-and-innovation-policy/the-danish-council-for-research-policy>.

9 Act on research consulting, etc., part 1, art. 1, para 4.

10 Ibid.

released in the autumn of the same year.¹¹ The recommendations made in this report may eventually form a part of further discussions in this regard.

2.1. The Danish Council for Independent Research (DFF)

The Danish Council for Independent Research has been operational since January 2004. It was created as a successor (next to the former Danish Council for Strategic Research) to a set of six independent national research councils. In a structural similarity to the recent establishment of the Danish Council for Research and Innovation Policy DFF was, therefore, a product of a review process intended to re-align the previously more diverse Danish research support landscape. In its operation it has since been a central body in research funding for all main areas of Danish academia. It has also made use of its expertise within science and research to provide advisory services on research questions to the Danish Minister for Higher Education and Science just like other relevant actors e. g. government ministers, the Danish Parliament, and external institutions in order to actively fulfil its tasks as a contributor to the increase of the level of research and academia in Denmark.

2.1.1. Structure and Funding Role

At the basis of DFF's structure stands its Board of Directors with nine members, all of whom must be recognised researchers.¹² One of these members serves as the Chairperson of the Board. This Chairperson and all ordinary members of the Board are appointed by the Minister for Higher Education and Science in their personal capacity. They are appointed for an initial four-year term and they can only be re-appointed for an additional term of two more years for an overall maximum of six years in office.¹³ The Board constitutes the governing body of DFF and is given the authority to draw up its own statutes. It carries the responsibility to ensure that DFF fulfils its purpose in the foreseen manner.¹⁴ It is also eligible to establish and to name up to six subject-specific research councils. By making use of the latter competence, the Board has established the following five subject-specific research councils tasked to fulfil DFF's funding and advisory functions for the respective fields of research: Humanities (FKK), Natural Sciences (FNU), Social Sciences (FSE), Medical Sciences (FSS), and Technology and Production Sciences (FTP). Each of these subject-specific research councils is headed by a council chairman and consists of an overall membership of 12 to 18 members. These members like the Board members are appointed by the Danish Minister for Higher Education and Science. The chairmen are elected by the membership of the respective subject-specific research councils themselves. There cannot be an overlap in membership between the Board of Directors and the subject-specific research councils. At the same time, cooperation and coordination between the Board and the chairmen of the different subject-specific councils are encouraged and conducted through the institutionalised meetings of the Chairmen's Group with approximately six meetings per annum. The Board furthermore conducts and oversees coordination processes with the Danish Innovation Fund, the DNRF, and the rest of the research system. This is particularly the case with regard to activities linked to international partnerships.¹⁵

11 Evaluation of the Danish National Research Foundation (DNRF), report 2013, pp. 9 and 41.

12 Act on research consulting, etc., art. 10, para 2.

13 Ibid., para 3.

14 Ibid., art. 9.

15 Ibid., art. 9, para 3.

An exchange is also guaranteed with the Danish Agency for Higher Education (DAHE) directly in occasional encounters and indirectly via the general inter-departmental collaboration within the Ministry. DAHE was established on 1 October 2013 and replaced two former agencies – namely the Agency for Higher Education and Educational Support and the Agency for Universities and Internationalisation. It is, therefore, now to be considered as the ministerial institution responsible for governmental development and administrative tasks in relation to universities and higher education, the administration of student loans and grants, and quality and coherence in higher education programmes.

As an independent body, DFF is supported by a secretariat. This role is fulfilled by a division in the Danish Agency for Science, Technology and Innovation (DASTI) as part of its tasks as a Ministry for Higher Education and Science agency. The interaction and collaboration between DASTI and DFF has been prescribed in a Service Level Agreement concluded between the DFF Board's chairman and DASTI's Director General.¹⁶ The secretariat is designed in a matrix organisation structure with specific units representing the different areas of academia addressed by DFF and the subject-specific councils in particular as well as interdisciplinary and especially designated fields of support.

The overall annual research funding by DFF in the years 2009 to 2013 amounted to DKK 1.2 billion (EUR 148). In 2013, the budgeted funds were attributed to the five thematic research areas and granted by the subject-specific councils in the subsequent ratio: Humanities DKK 153.4 million (EUR 20,5 million), Natural Sciences DKK 285.6 million (EUR 38,3 million), Social Sciences DKK 117.4 million (EUR 15,7), Medical Sciences DKK 274.6 million (EUR 36,8), and Technology and Production Sciences DKK 280.4 million (EUR 37,6). 2013 was a year with unusual high success rates due to special circumstances which included only one round of applications for DFF-Individual postdoctoral grants (normally two) and a larger amount of returns from earlier years' grants. With a total of 2,347 grant applications and 457 grants awarded, the success rate gauged by numbers of applications was at 19% for that year, whereas it was at 16% if calculated by amount granted. Especially the 2013 success rate for the latter was unusually high due to the special circumstances for that year. From 2009 to 2012 the average success rate was at 13%. For 2014, the success rate by amount granted is expected to range around 10%. This is caused by a large number of applications for the YDUN programme, which is only offered once.

Funding decisions are taken by the subject-specific councils in accordance with guidelines set out by the Board which have a binding character for their decisions.¹⁷ The Board does not have authority to interfere in the funding decisions taken by the subject-specific councils, but, as a governing body, it ensures that all subject-specific councils act according to their obligations and in observing the given guidelines. It also oversees the prescribed involvement of relevant external assessors in the evaluation and decision-making processes for funding applications.¹⁸ By way of its competence to

16 "Memorandum of Understanding of the Danish Agency for Science, Technology and Innovation's (DASTI) secretariat services for the Danish Council for Independent Research", signed by Mr Munk Christiansen for DFF and Mr Müller Pedersen for DASTI, entered into force on 1 April 2014.

17 Ibid., para 2.

18 Ibid.

distribute the respective funds between the different subject-specific councils, through its capacity to establish the guidelines for the distribution of funding to applicants from academia, and by way of its overall role as a governing and supervisory body, the Board can be said to have an important if indirect impact on the procedures and settings in which funding decisions are taken by the subject-specific councils.¹⁹

Membership in the subject-specific research councils is offered to recognised researchers exclusively. The Minister for Higher Education and Science appoints a total maximum of 75 members to the subject-specific councils in their personal capacity. The Minister is held to ensure that each subject-specific council possesses as broad an academic membership within its thematic field of activity as possible; a wide-ranging Danish national and international research experience is a further criterion for the composition of the subject-specific councils' membership to be considered by the Minister in the appointment processes. Funding decisions taken by the subject-specific research councils are taken along the lines of the provisions stipulated by both the Act on research consulting etc. (in particular according to art. 7) and by the guidelines established by the Board.²⁰ The funds are generally awarded personally to the main applicant from academia who is responsible for their sound administration and subsequent use. Funding decided upon by the subject-specific councils can be attributed to individual areas of research, interdisciplinary research, and Danish researcher's international activities. Funding decisions must adhere to the published criteria and DFF is to ensure that funding is awarded to international research collaborations in a sufficient and suitable manner.²¹ Decisions can be taken in favour of *special initiatives* as set out by the Board which may include interdisciplinary initiatives or those involving more than one subject-specific council. A maximum of one fifth of DFF's overall funding may be attributed to such special initiatives.²²

The Minister for Higher Education and Science has the authority to lay down specific rules relating to and governing the broader lines of DFF's work. The Minister's authority includes but is not limited to prescribing the conditions for the Council's financial reporting, the preconditions for its funding, just like the calls for funding, their publication, and related requirements. In this capacity the Minister has a legal authority to formulate general expectations which can be as detailed as setting out specific obligations for the DFF funding decisions; this can be the obligation to involve external experts in the assessment of applications and to specify the degree of such an involvement or formal requirements including such for binding online communications and application deadlines. Also, while decisions by DFF's Board and the subject-specific councils cannot be appealed to from the outset, the Minister may determine that complaints can be filed with regard to legal questions related to rulings by the subject-specific councils or by a body the former may have delegated decision-making authority to. This kind of legal complaint would then be brought directly before the Minister.²³ Furthermore, "politically prioritised measures" can be defined, which the Council can be asked and/or authorised to support in addition to its regular field of basic independ-

19 Ibid., art. 11.

20 Ibid., art. 13.

21 Ibid., art. 7 and art. 30; cf. below.

22 Ibid., art. 7, para 3 and art. 11.

23 Ibid., art. 15

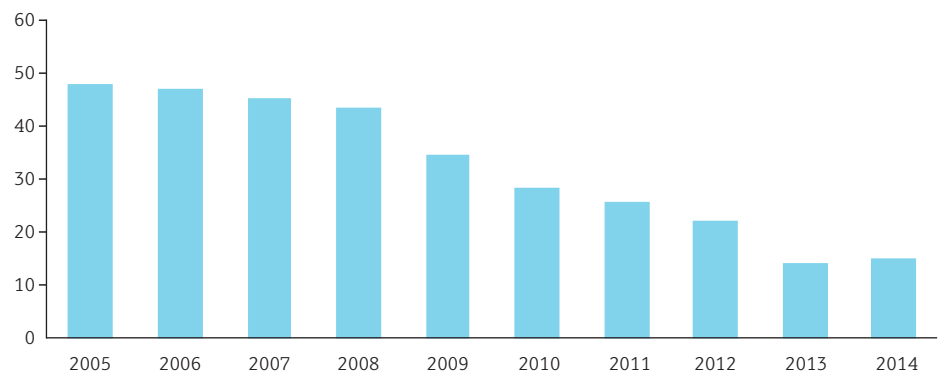
ent research funding.²⁴ Combined with the aforementioned authority to appoint the members of the Board and the subject-specific councils, the Minister for Higher Education and Science, through these competences, has a relevant leverage to impact and direct the work of the Danish Council for Independent Research. Based on its annual plans of action DFF together with the Ministry determines the suitable way forward in contributing to maintaining Denmark's position in research and academia. As a basis for such action plans, the work of DFF is shaped to include and observe some basic priorities: Quality and excellence of research are to be strengthened through researcher-initiated research and a high level of diversity in research is to be maintained. DFF thrives to guarantee this by selecting some of the most talented researchers with some of the most innovative research ideas in its different lines of support.²⁵ One important aspect in these aspirations is to increase the eligibility of researchers supported by DFF for subsequent international funding from institutions like the European Research Council (ERC). This ambition is also reflected in the internationalisation strategy DFF pursues.

2.1.2. Current Funding Instruments

Throughout the recent years, DFF has attempted to systematise and simplify the realm and scope of its funding activities with inter alia a considerable reduction in the number of funding instruments in place. From almost fifty in 2004, the number of different support instruments has been reduced drastically to below fifteen in 2013.²⁶

Figure 2.2

Development of the Number of Funding Instruments, 2005 - 2014



Source: The Danish Agency for Science, Technology and Innovation

Note: Cross-council, common instruments are only counted once

Motivated by the ambition to define the different lines of funding more clearly and aiming at a suitable support structure for some of the best researchers and their needs to realise high standard and innovative projects, these steps are intended to stimulate an even better and internationally competitive research output. Application procedures shall be simplified to ease the administrative requirements inflicted upon the applicant researchers at the same time.²⁷

²⁴ Ibid., art. 7, para 4.

²⁵ Cf. DFF Self-Evaluation Report 2014, pp. 17 ff.

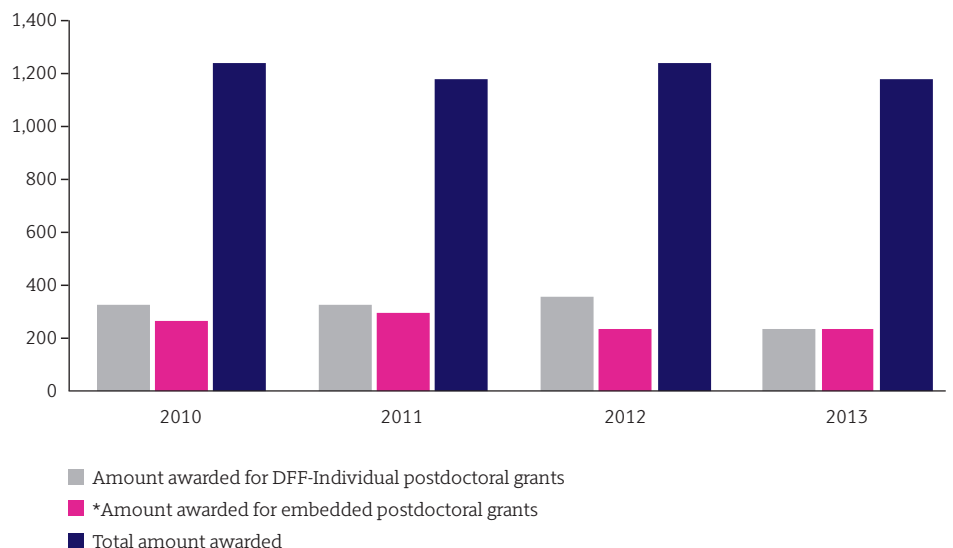
²⁶ Cf. DFF Self-Evaluation Report 2014, p. 29.

²⁷ Cf. DFF Self-Evaluation Report 2014, pp. 14 and 28 ff. for more detailed information.

Changes and amendments to the support instruments were mainly conducted from 2008 to 2009 and from 2012 to 2013 respectively. The three central funding instruments in place today are Postdoctoral Grants, Research Projects, and the Sapere Aude Programme. These three programme lines make up for 97% of the funds distributed by DFF; the number of instruments with funds for smaller and council-specific support has been reduced to favour the aforementioned funding programmes. Calls for applications and the selection processes for these just like for other lines of funding are conducted in an open national competition format accompanied by international publication. According to DFF's self-evaluation, the most relevant considerations to take such drastic steps in re-structuring the funding instruments involved the wish expressed by Danish universities that the range of funding instruments offered just like the application procedures for them should be designed in a clear-cut and transparent manner. It has also been the declared ambition of DFF to harmonise the thematic calls of the five subject-specific research councils following their re-structuring process and according to its operational set-up since 2005. In 2013 DFF published its first joint call for proposals with the identical set of funding instruments being applied to research fields of all five subject-specific councils.

As a predominant aspect in its funding, DFF particularly aims at supporting younger talented academics in the effort to attain their research goals. This is in particular pursued with the ambition to provide the best research conditions for such aspiring talents. DFF has, therefore, chosen to invest an amount equal to approximately 45% of the funds at its disposal in *postdoctoral grants*. Approximately half of these funds are granted through DFF's Individual Postdoctoral Grants, the rest of them come as embedded postdoctoral grants in the Research Projects or the Sapere Aude instruments.

Figure 2.3
Amount awarded for DFF Postdoctoral Grants 2010 - 2013 (DKK million)



Source: The Danish Agency for Science, Technology and Innovation

Note: *Amount awarded for embedded doctoral grants 2010-2011 is estimated based on the amount awarded for DFF-Individual postdoctoral grants combined with the number of embedded postdoctoral grants. In 2012-2013 the amount is estimated based on informations from the applicants

With these funds DFF is in a position to provide funding for some 300 postdoctoral researchers annually while attempting to attract national just like international talents working abroad to re-locate to Denmark and, thereby, further enhance the attractiveness of the Danish research environment. Postdoctoral funding comes from two different sources: those directed towards individual research projects are to be differentiated from those of an 'embedded' nature where the postdoctoral research activity is part of a larger research project. In the latter the grant recipient is not the postdoctoral researcher her-/himself, but a more experienced researcher acting as the head of the respective research project and fund recipient guaranteeing the involvement of a postdoctoral researcher.

The funding programme *Research Projects* is another of the three main funding instruments currently in place. Like the previously described, it has been developed in merging a number of pre-existing funding instruments. Support for Research Projects has been offered as a field of funding since DFF was first established. The current funding instrument is focused on providing researchers with the opportunity to explore their research project ideas; regardless of the topic. To enable an efficient and well-defined handling of the respective projects and for an appropriate oversight, Research Projects have been grouped in three different categories (groups 1, 2, and 3).

Table 2.1
Support Categories and Funding Levels

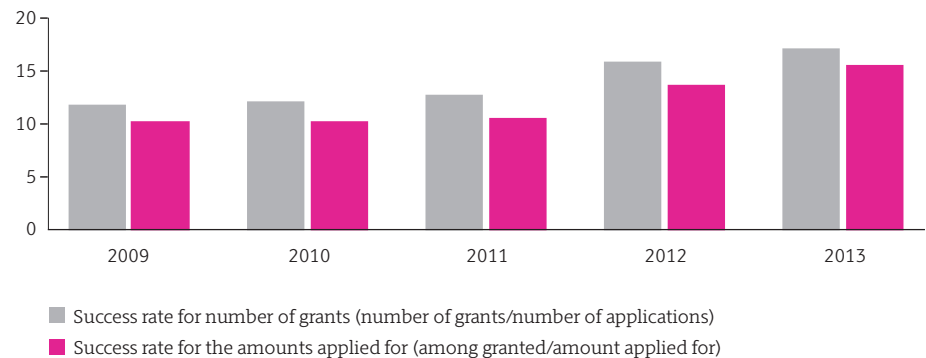
Instrument	Average grant size (including overhead rate of 44 percent)	Maximum grant size incl. overhead (2013)
Sapere Aude		
Research talent	483,000 DKK (65,000 €) Add-on to an individual Postdoc-grant	500,000 DKK (67,000 €) Add-on to an individual Postdoc-grant
Starting grant	6.7 m DKK (900,000 €)	7 m DKK (950,000 €)
Advanced grant	11.3 m DKK (1.5 m €)	12 m DKK (1.5 m €)
Research Projects		
Research Project 1	2.1 m DKK (280,000 €)	2.6 m DKK (350,000 €)
Research Project 2	5.1 m DKK (680,000 €)	6.5 m DKK (870,000 €)
Research Project 3	9.1 m DKK (1.2 m €)	12 m DKK (1.6 m €)
MOBILEX	2 m DKK (275,000 €)	2.5 m DKK (340,000 €)
Individual Postdoc	2.2 m DKK	No budget limit (Wage and operating expenditures)

Source: The Danish Agency for Science, Technology and Innovation

With a progressive level of complexity in the respective project design and an ascending number of actors involved depending on the academic field at hand, the maximum funding level for the three groups is set at DKK 2.6 million (EUR 349,000), DKK 6.5 million (EUR 670,000), and DKK 12 million (EUR 1.6 million) respectively. The number of rejected Research Project applications has been rather high and regularly surpassed 85% in past years. This can be contrasted by the figures for the overall success rate of applications to DFF gauged by numbers of applications, which has been

at or close to 18% for the last five years (2009 to 2013; 15% in 2011). The success rate based on amount granted has been 13.6% in that period. Either way many Research Projects considered as being of high quality cannot be supported by the Council due to its limited resources. Many of the applicants rejected in the selection processes of this line of funding were able to claim funds from other sources subsequently according to an evaluation conducted for the time period between 2001 and 2008.

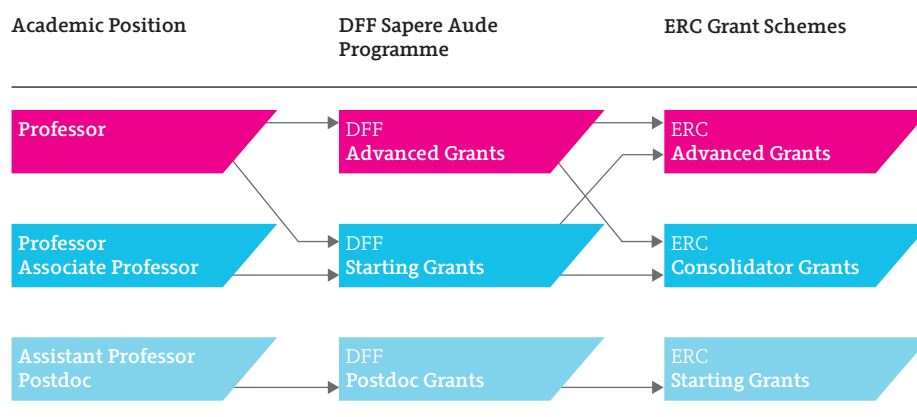
Figure 2.4
Success Rates for Research Project Applications, 2009 - 2013 (percent)



Source: The Danish Agency for Science, Technology and Innovation

In the *Sapere Aude* ('Dare to Know') funding line, it is the ambition to support the best Danish researchers in their career development and enable clear career paths for them. This involves support for the development of international profiles to increase researchers' chances of international academic breakthrough and success. This field of funding is likewise designed in application of three funding groups: the DFF Research Talent, the DFF Starting Grant, and the DFF Advanced Grant. The Research Talent grant can be obtained complementarily by those younger researchers who have obtained an Individual Postdoctoral Grant in the same year; the Research Talent grant ranks at a funding level of up to DKK 0.5 million (EUR 67,000). The Starting Grant is designed for those researchers who are ready to lead their own research team, but who have not necessarily attained professorship level yet; the maximum funding level for this group of applicants is at DKK 7.1 million (EUR 954,000). Finally, the Advanced Grant is directed at researchers at a full professorship level with the qualifications to lead a research team according to the highest international standards with a maximum funding level of DKK 12 million (EUR 1.6 million). The latter category of grants has only been offered since 2012. And while a total of 162 Research Talent Grants and 105 Starting Grants have been assigned, Advanced Grants have so far only been awarded 14 times. The entire *Sapere Aude* research career programme is aiming to stimulate the competences and to create the incentives for the supported academics of the highest level to eventually be eligible for ERC funding which is also actively encouraged in the grant letters sent to the recipients. The programme will be subject to an evaluation in 2015.

Figure 2.5
Interconnectedness between DFF and ERC



Source: The Danish Agency for Science, Technology and Innovation

Next to these three funding instruments there are more specific and more temporary lines of funding: *MOBILEX mobility grants* is an EU-supported mobility grant designed to contribute to an increase in terms of mobility in Danish just like in international research settings for both in- and outbound postdoctoral researchers. The programme has in parts been established as a response to an increase in the number of applications for collaboration projects involving international aspects and partnerships.

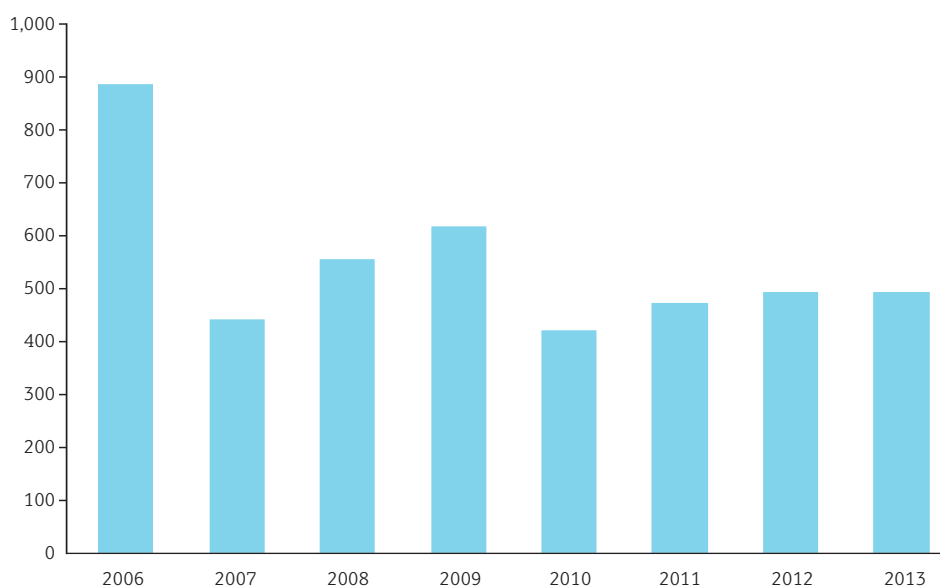
In 2013 the Board furthermore proposed the establishment of the *Younger Women Devoted to a University Career* (YDUN) funding line. This initiative is particularly directed towards creating academic career opportunities for female researchers at associate professor level or similar. Full professors, professors with special responsibilities or clinical professors cannot apply for YDUN. Today approximately 30% of the associate professors and less than 20% of the full professors in Denmark are women. The programme offers a maximum amount of DKK 4.5 million (EUR 600,000) to those candidates who fulfil the criteria at the time of the call for this initiative. The basis for this funding line is a political agreement. It shall offer grants for the successful candidates throughout a funding period of up to four years starting in 2014. This funding opportunity to be offered only once.

Finally, specific funding for the individual subject-specific research councils has been reduced continuously throughout the last years and was at only roughly 1% of the total funding available in 2013 (down from approximately 3% in 2009). Specific funding instruments remain in place for the three subject-specific councils Humanities, Social Sciences, and Medical Sciences. The specific instruments offered are: Research Networks and Scientific Conferences and Journals (Humanities), Research Stays Abroad (Social Sciences) just like Pre-graduate Scholarships and Clinical Scientist Positions (Medical Sciences).

2.1.3. Advisory Role

In its advisory role, DFF is called upon to provide advice associated with the research initiatives it supports in its funding capacity as described above; the advice, therefore, is meant to be research-related.²⁸ Before the latest 2013 revision of the underlying Act on research consulting etc., the scope of DFF's advisory role had been defined to include a broader range of possible services. Throughout the past years (2010 to 2013) the number of advisory engagements has remained at a relatively stable amount of approximately 430 to 500 service cases.

Figure 2.6
Number of Advisory Services, 2006 - 2013



Source: The Danish Agency for Science, Technology and Innovation

An important part of such advisory services has been directed towards the Danish government represented mainly by the Minister for Higher Education and Science as prescribed in the Act on research consulting, etc. as a legal basis and the role accorded to the Minister therein. Through the composition of DFF with experts from different research fields, high level input and advice can be provided for questions related to these fields of competence. Different Danish government and parliamentary actors and groups rely on this expertise. DFF is also in a position to provide its advisory services to other public and private organisations in Denmark and on an international, particularly European, level. This can involve appointment procedures for membership in relevant working groups, bodies and institutions, or recommendations for research awards and the like as described further below.

In a variety of cases, advisory services are provided to other funding institutions and foundations with regard to their distribution of grants. Given the often long-standing relationship and cooperation between DFF and supported institutions, the latter rely on the scientific advice offered by DFF to perform their funding role. Advisory services

²⁸ Act on research consulting, etc., part 1, art. 1, para 4.

are regularly provided by the Board and in collaboration with the relevant subject-specific research councils. Some of the most recent main advisory service recipients include the Danish Council for Technology and Innovation (DCTI), the Danish Advanced Technology Foundation (DATF), the Danish National Research Foundation (DNRF), the Danish e-Infrastructure Cooperation (DeIC), and the Lundbeck Foundation.²⁹ In relation to the DNRF, the other relevant publicly funded basic research support body, advice is provided mainly with regard to application processes for the Foundation's two main funding instruments the Centres of Excellence (CoE) and the Niels Bohr Professorships. In the 2013 evaluation of the DNRF, the fields of work of DFF and the Foundation's activities were differentiated; DFF was mainly characterised as focusing on research project support, and the DNRF principally as providing the funding for its CoE scheme.

In the advisory context, DFF is also playing a role in contributing to a close collaboration with other relevant funding bodies just like political decision makers on a national and European level. According to its own statements, DFF is the "most heavily utilised body when it comes to scientific research advisory services in Denmark" and it has considered its role as being "required to apply its academic research expertise to advise society at large as well as the Danish scientific research environment."³⁰ DFF, therefore, places a high priority on its research advisory role and services.

2.1.4. Internationalisation Strategy

Irrespective of the specific area of academia, questions of internationalisation are of almost ubiquitous relevance in current research contexts. DFF is, therefore, undertaking an effort to position Danish research in an ever-internationalising environment and in improving the openness in the Danish research system towards national and international researchers currently engaged abroad. Both ambitions are pursued by means of respective mechanisms and support concepts. On the one hand, funding instruments are continuously amended to fulfil the conditions and requirements according to international standards. On the other hand, collaboration and co-funding with international funding institutions is desired and actively pursued. Special initiatives to strengthen the internationalisation processes are being launched in the Danish research landscape on an ongoing basis with a particular ambition to foster synergies, improved coordination with international research programmes, and, thereby, an added value through international knowledge exchange, mobility, and an increased ability to obtain international research grants. A strong Danish involvement in international research funding and policy bodies is considered as a crucial precondition for the success and internationalisation of research and academia in Denmark.

DFF has prioritised six overarching focus areas for strengthening the international component in the Danish research environment. These priority fields entail the strengthening and support of international components in research project implementation, international collaborations, publications via internationally accessible channels, international research conferences, research stays abroad, and attracting foreign talent to Denmark. International aspects have also been included in more specific form, of which some has been described above, in the different funding instruments of DFF.

29 Cf. DFF Self-Evaluation Report 2014, pp. 66 ff. for more detailed information.

30 DFF Self-Evaluation Report 2014, p. 69.

In selection and evaluation processes for project funding in the Postdoctoral Grants and Research Project lines international aspects are generally considered positively. This benefits the situation in which a relatively high number of projects with international components can be supported. With Sapere Aude it is one of the declared ambitions of DFF to stimulate and prepare Danish researchers to apply for ERC grants. Their chances to obtain such funds at a later stage in their academic careers are to be increased through the experience, insight, and acknowledgement derived from successfully claiming the DFF grant.

Table 2.2
Relationship between DFF and ERC Grants, 2007 - 2013

	2007	2008	2009	2010	2011	2012	2013	Total
Number of ERC Grants to be conducted at a Danish institution	4	4	10	10	19	22	9	78
ERC Grant holders who previously have received a grant from DFF	2	3	6	5	12	10	6	44
Number of postdoc grants granted to ERC Grant holders	0	0	2	0	2	2	3	9
Number of DFF-Research projects granted to ERC Grant holders	1	3	9	5	13	6	9	46
Number of Sapere Aude: DFF-Starting Grant granted to ERC Grant holders	0	0	0	1	3	2	3	9
Number of other instruments granted to ERC Grant holders	2	3	10	4	7	7	3	36

Source: The Danish Agency for Science, Technology and Innovation

In how far this ambition and the goal formulated by the Danish government to reach a cumulated total annual funding amount of DKK 1.5 billion (EUR 201 million) from the EU support programme Horizon 2020 for research in Denmark have been attained shall be considered as part of the envisaged evaluation of the Sapere Aude funding instrument in 2015. Sapere Aude in itself also aims to contribute to an internationalisation process: 17 foreign nationals have been amongst the overall 117 grant holders in the Sapere Aude and Advanced Grants programme lines to date. Indirect effects such as the consequences of aligning selection procedures for DFF grants to internationally applied standards (e. g. those of the ERC) are considered a possible further source of an increasingly successful internationalisation of Danish research. In a more concrete manner, Danish academia has further been internationalised through the MOBILEX mobility grants offered by DFF for younger researchers at the postdoctoral stage. Possibilities to conduct research as an in-, or outbound visiting researcher in Denmark or another country (where the researcher has not resided for more than 12 months within the three years prior to application) are being offered. This can potentially be a basis for later international academic networks and success.

On the advisory level, DFF has engaged in a broad range of international collaborations with inter alia the Nordic research councils and as a member of Science Europe, a forum of European research organisations and funders with four Danish committee members which have been supported by DFF and with whom an institutionalised dialogue is maintained. Membership in the European Science Foundation (ESF) has been maintained since its establishment in 1974, but will expire in 2015 as a transfer of ESF's predominantly coordinative and member-driven strategic research activities

to Science Europe shall be completed by that time. There have also been meetings and substantive exchanges with representatives of European institutions like the European Commission and the European Parliament to contribute to a sustained development of research in both the EU and in Denmark. With its aforementioned own funding activities DFF has contributed to the development of a European research environment in indirect ways. Through a more direct advisory engagement it has contributed to the formation process of the structural basis for the ERC as conducted by the European Commission just like with other consultation activities and expertise. In the framework of the European Research Area (ERA), and in particular as part of the more concrete ERA-NET format of pan-European research project collaborations, DFF has participated in eight ERA-NET projects with a total amount of DKK 55.3 million (EUR 7.4 million) of funding provided since 2004. Additionally there have been some joint programming efforts, in particular directed to the humanities and to select areas of the natural sciences. Funding in this field of support for research projects with a minimum of three parties from a minimum of three countries is on a relatively small scale and does regularly not surpass amounts between DKK 750,000-1 million (EUR 100,000 to 130,000).

As laid out in more concrete form in sections above, contributions by DFF to internationalisation processes in an evolving research landscape have been made in both its funding and advisory roles. DFF's ambition in such activity was to guarantee a translation of its engagement into concrete results. If such concrete results have generally been attained to the desired extent remains a question for further consideration as clear definitions and reporting on (monetary) contributions and their effect are difficult to derive in a field as transient as the internationalisation of academia.

3. An International Perspective – Principles, Guidelines, and the Role of DFF in the Danish Research System

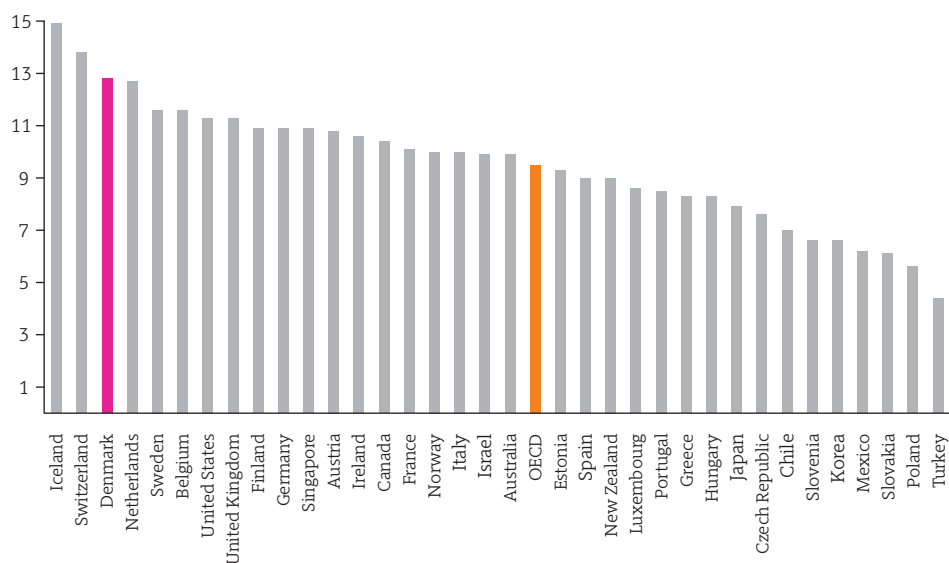
With its broad range of responsibilities and activities, DFF has an ambitious mission to accomplish. Its role in the wider Danish research system will be put into perspective and more generally be considered in the following parts of the report. In the process of evaluation it has become apparent that DFF forms an important and highly valued part of the Danish research funding infrastructure. It can be regarded as generally accepted that DFF's tasks can only be accomplished in a sound overall research (funding) environment. Some more general observations shall contribute to the understanding of what such an infrastructure should look like; they can possibly serve as a source of inspiration for the further development even in a research environment as successful as the Danish. While these considerations are of a more fundamental character, they are meant to serve as a basis for the specific analysis of DFF's role in the Danish research system.

3.1. Principles and Guidelines for an Efficient and Effective Research Ecosystem

Research systems throughout Europe and internationally regularly carry different traits making up for their most noteworthy characteristic features. These can entail structures with widely differing traditions: While some national university systems are based on the Humboldtian tradition of a broad and much-encompassing selection of thematic fields and faculties, others are an example of individual institutions' reduction to specificity in order to guarantee their focus and high level of professional concentration on very select fields of academic expertise. Similarly big differences and respective path-dependencies can be observed in a comparison of private and public university structures and, in a more detailed analysis, with regard to funding bodies and organizational structures. At the same time, the challenge to maintain a strong national and institutional recognition in an international research environment is a sound and valid reason for the maintenance of regional and even local research activities.

The Danish system – quite similar to the Swiss in size and scope – like Switzerland is widely recognized as one of the most efficient and effective research systems in the world. Among other things this is reflected in the impressively high number of citations it achieves for its research publications. This is usually considered an important indicator of success. In Denmark the overall citation rate ranges at a strong average of more than 12 high level citations per publication according to a 2012 Thomson Reuters report. In Switzerland the comparable figure stands at close to 14 such citations per publication according to this data.

Figure 3.1
Citations per Publication, OECD, 2008 - 2012



Source: InCitesTM, Thomson Reuters (2012). Report Created: 15-07-2014

While these 'success' rates can only be considered as one of the indicators to gauge research success and do not apply to all fields of research or faculties in a comparable manner, they can nonetheless serve as a basic yardstick. Other factors, like a high number of renowned scientific awards received by researchers from a particular country, or the number of breakthrough research findings may be considered, but they can be misleading all the same. Measuring research success cannot be a one-dimensional exercise; the analysis of the quality of supporting funding mechanisms can, therefore, not be accomplished in a simple manner either. To a large extent their success is linked to the research community and its general perception of support earned.

This being said, it is not only due to high citation numbers that Denmark and Switzerland, and in particular their research infrastructures, can be considered as comparable to a certain extent. The level of academic proficiency both in Switzerland and in Denmark is linked to a strong underlying research funding infrastructure. A part of this underlying system has been described above and will be exposed below to a more in-depth analysis, appreciation, and evaluation for the Danish environment. Other funding cultures and mechanisms will not be addressed in this review. But it should be noted against the background of different international research landscapes that there are some recurrent factors which can contribute to high performance research environments. The level of funding available for the support of tertiary education on a national scale, and the ability of its actors to attract additional funding internationally can be considered an important basis for all successful research systems. Bearing this in mind, it must not be overlooked that other criteria are similarly fundamental for the initiation and maintenance of successful research. Some of these central aspects for research success can well be captured and described, others may escape the general methodologies of review. How well a research ecosystem is performing depends in complex ways on the financial resources available, the quality of the human resources involved, the degree of intense cooperation, interaction, and integration among the

various stakeholders, on the creativity of people throughout the system, and on the transfer of their ideas into social and economic practice.

3.1.1. A Sound Framework for the Public Research System

Research requires an appropriate legal, institutional, and financial framework. This framework needs to ensure that a variety of institutions, organizations, and policies are put in place which give effect to the different functions required. While this can partly be guaranteed through the attribution of sufficiently high levels of research funding, other aspects such as freedom and autonomy will be of similar relevance. Individual research institutions can strongly impact the output of their affiliated researchers in creating inspiring micro environments or 'habitats' in the overall research ecosystem.

On a more macro-level, system-wide note, research needs to be conducted based on reliable structures and should be able to blossom in a well-preserved but also sufficiently well-exposed and challenging environment. Guaranteeing for such a setting is a task not easily achieved under the influence of scientific and scholarly requirements, institutional interests, and frequent political transition processes. It should be an ambition of all actors involved to provide for a balanced underlying organizational structure and a stable financial regime.

3.1.2. Autonomy, Transparency, and Accountability

Research necessarily requires a far-reaching scope of freedom. But research funding bodies will in many areas also serve some of the national and transnational interests they may be based on. This is the case for national research funding and support agencies – in particular in the field of strategic or applied research. For the basic research fields, the highest possible degree of independence should be guaranteed; attempts of political alignment should be avoided as far as possible.

For all fields of research support transparency and accountability of the research funding bodies towards their public donors, and of the researchers towards funding agencies and host institutions, should be main characteristics. Research support should always be provided in transparent and well-accessible structures and processes. A good equilibrium of independence, transparency, and accountability in the different spheres of a research system is key to creating and maintaining a successful research ecosystem.

3.1.3. Planning, Monitoring, and Evaluation

While freedom and independence can be considered main criteria, monitoring and evaluation are of similar relevance. The detection of potentially high quality research is a difficult task in itself. A well-designed and structured research support setting can be an important basis for such recognition. Only in such a system, monitoring and evaluation can be implemented appropriately. The results of this can again help to develop competences in research assessment and notably the design of suitable support instruments and mechanisms. Such a well-structured set of instruments should provide the basis of any research-funding system to avoid obvious insufficiencies.

3.1.4. Dynamic Leadership and Strategic Management

It is crucial to guarantee sound and far-sighted leadership in all fields of research. The development of clear strategies and their implementation by well-placed and clearly mandated management can be considered a contributing factor on the track towards accomplishing research success. While cooperation is a central element for the successful work of research funding mechanisms, the main stakeholders involved (government, funding agencies, individual researchers, and universities) must each possess an appropriate standard of autonomy. This will not only allow for them to fulfil their mandated role in an appropriate manner. It will also enhance their respective level of credibility and respect accorded to them by the public.

3.1.5. Interaction, Cooperation, and Partnership

Observing the above-mentioned appropriate levels of independence and autonomy, academic success can only be attained in a constructive atmosphere of interaction, cooperation, and partnership. All actors must be willing and able to interact in order to achieve the common goal of nourishing and protecting a productive research environment. Cooperation should be aspired to whenever common themes and similar interests have been identified. Partnership may be entered into when this is sensible in an institutional structure and when general interests of the wider academic community can be impacted positively by such a rapprochement. It should be avoided at any time to neglect, or even hinder the exchange in the system of communicating tubes which is the research funding environment.

3.1.6. Internationalisation and Strategic Alliances

In a research environment which does neither halt nor end at any institutional or national border, internationalisation processes have grown to be of increasing relevance. This development should also be taken into consideration by research funding bodies and stakeholders within their respective roles in the funding environment. Funding bodies should consider and position their approaches and instruments in exchange with similar bodies internationally; in particular the comparison with bodies from similar research environments can be helpful.

Governments are bound to interact in inter-, and supranational organisations in many fields of policy-shaping today. To a lesser extent this is also true for a traditional national and culturally impacted domain like research policy. Universities and researchers regularly and actively form a part of international collaborative research projects and are more and more addressing border transgressing themes with their respective research projects. Possible strategic alliances should always be subject to in-depth considerations with regard to sensibility and suitability before their establishment. They can form an important additional component of internationalisation activities, last but not least in making them more sustainable.

3.1.7. Successful Research Funding Structures

Funding structures have to be established specifically for the relevant academic research environment. This can only be achieved with the knowledge contributed by experts of the academic landscape at stake. At the same time, comparisons with other systems in place can be a useful source of inspiration and adaptation. The putting into place of sound funding structures requires a strong interrelation of all actors involved. Their sound interplay and respective institutional leadership (cf. above) can be a reli-

able basis for the development of research funding structures as required for a specific research environment. Adaptations at regular intervals are required once such a system has been installed to allow for further improvements and necessary amendments to be implemented.

With these factors considered, good soil for a blossoming research landscape can be prepared. Much of this broader framework has already been created in Denmark. This was underpinned inter alia in the 2013 external evaluation of DNRF which brought about largely unblemished results. The evaluation of DFF comes at a time when numerous structural changes have been put into effect for the wider research funding system only recently. The described basic criteria for a successful research environment and funding structure can be considered to be at the base of some of the observations which will be addressed as part of the more concretely DFF-related findings in the following parts of this report. It is the conviction of the Evaluation Panel that in continuous observance of the principles outlined above, the Danish research system will also find excellent soil to grow, evolve, and bring about rich fruits of success in the future.

3.2. Role and Function of DFF in the Danish Research System

DFF forms a crucial part of the Danish national research system. It is the sole public funding body providing financial support to researcher-initiated projects, to a large extent pursued by a range of younger and aspiring academic talents at the beginning of their careers. Applicants can be all researchers as of the postdoc level. In an overarching system-wide analysis it becomes apparent that DFF has a key role to play, in particular in view of the fact that none of the other public funding bodies can be considered as a supporter of career development for the early stages of academic careers. DFF offers a number of such support mechanisms. Its role as supporter of aspiring research talents provides a strong basis for the overall health of the Danish research ecosystem. This is particularly the case for some research disciplines, like the humanities and the social sciences as well as physics and mathematics, where other funding opportunities – public or private – are rare in the Danish research funding and support system.

DFF can further be described as the funding body supporting individual researcher-initiated projects which range from the smaller postdoc support scheme to expensive research projects like its Sapere Aude step 3 line of funding.³¹ This general range of activities is a differentiating factor from the other support bodies in so far as it includes the early academic career levels and as it is addressed specifically to basic research. DNRF offers basic research support to a large extent through its excellence scheme, the 'Centers of Excellence' (CoE), and overall takes a more elite-oriented approach supporting the high end of academia. CoEs do also attract junior researchers, but they do not offer as independent a research environment as can be provided for as a result of a successful postdoctoral application for funding by an early-stage individual researcher.

DFF carries out the role of a core independent basic research support body in an impressive manner. Other funding institutions may partly support similar research projects, but their general focus is not on the combined traits of independent, researcher-initiated projects with a large thematic variety and particular opportunities for young researchers in the field of basic research. Along with this role DFF has developed its

31 Cf. above on pp. 15-21 for more details with regard to DFF funding instruments.

function as a supporter as well as an enabler and initiator of high quality basic research in Denmark: The competitive quality selection and funding offered by DFF is to serve as a qualifying step for Danish researchers towards obtaining international and, in particular, ERC grants to an increasing degree.

Another function pursued and filled by DFF is that of an active contributor to gender equality and internationalisation in the Danish research environment. The general flexibility in the design of its funding instruments, the kind of research support offered by DFF, and the type of research projects supported make it an important catalyst for the promotion of research talents and emerging topics of great relevance to the entire Danish research ecosystem.

Next to the DNRF, Innovation Fund Denmark (IFD), and the Danish Council for Research and Innovation Policy (DCRIP), DFF has been attributed its own well-defined field of activity. It plays a vital role in the Danish research ecosystem as the support agency for new and innovative basic research ideas and findings, a broad range of research areas, young researchers, just like aspects of general concern for the greater research environment like gender equality and internationalisation. This differentiating set of traits underscores the crucial institutional role that DFF carries for the further development of the Danish research system at large. An innovative and strong science base with a lot of talented young researchers is an indispensable precondition for subsequent success on higher and highest research levels. It is also a *conditio sine qua non* for many fields of strategic research regularly based on or at least impacted by the latest basic research findings. Access to new knowledge and the most recent developments in scholarship, science, and technology is crucial for the well-being of a knowledge-based society.

Therefore, it must be considered to be of the highest structural relevance that DFF fulfils its core functions and roles appropriately to strengthen Danish research and, thereby, to contribute to emerging opportunities for continued strategic or applied research success in the future.

The advisory role of DFF has been clarified as a result of the recent reform process in which much of the policy advice role has clearly been accorded to DCRIP. It may be considered a further refinement and even clearer attribution of roles and functions of the different public bodies serving research funding and support in Denmark. The concrete consequences and impact of this and other amendments will likely become more perceivable in the coming years with the practical implementation of the newly prescribed roles and functions of the different research support bodies.

Independent basic research as supported by DFF may not at all times be considered a strategic asset for the advancement of concrete goals. But it can well be regarded as an invaluable instrument for capacity building and as a knowledge basis for the further development and evolution of a healthy research ecosystem, a knowledge-based economy, and society at large. The Panel has no doubt about this and expresses its strong support for a perspective in which DFF with its role and function will remain a central contributor to and guarantor of a rich harvest of basic research fruits grown on fertile Danish grounds. A comparable research support mechanism is considered an important contributor to providing a strong research base, and thus serves as a source of societal progress and sustainable growth.

4. Assessment of DFF's Performance, Challenges, and Perspectives

With the unique role of DFF in the Danish research landscape in mind, the Panel was assigned with the task to evaluate the structure and activities of the funding body. The assessment of DFF's performance constitutes the core of these considerations. This assessment forms the basis for the final chapter of this report in which the Panel formulates its recommendations addressed to the different stakeholders. It is delivered with the intention to open paths towards a continuous amelioration of DFF's already very high quality of work and in view of researchers' current and future needs.

Considerations and recommendations expressed in this report are formulated with the intention to provide the requested external view and additional impetus to the continuous self-evaluation and consideration invested by DFF's Board and staff. The overall performance of DFF is considered to be of extraordinary and internationally highly competitive quality. This is also underpinned by the results of the bibliometric analysis conducted for and as part of this evaluation (see Appendix 5). The main focus of the analysis was on the proportion of highly cited publications, assuming that they can be linked to excellence in research. In order to provide a national and international context for the indicators calculated for DFF publications, two sets of benchmark units were used for comparison: 1) DFF's contribution to the national performance of Denmark; 2) ten European and American universities specifically chosen among the top-performing strata in different fields of the Leiden Ranking. The years reviewed included projects for the funding period from 2005 to 2008 which typically ended between 2009 and 2012. The analysis supports the conclusion that with respect to highly cited publications, DFF grants result in publications at a very high level, comparable to the highest-performing universities in Europe, and often better. DFF thus contributes notably to the overall Danish impact. Around 19% of DFF-supported publications qualify as highly cited, i.e. they rank among the top ten percentage group of most cited publications in the database (compared to 14.6% of all Danish publications). For the period analysed, DFF-supported research constituted about 7.8% of Danish publications, and they accumulate 9.7% of all Danish citations. According to this bibliometric analysis, DFF's citation results are thus close to the results found in DNRF's 2013 evaluation.

Apart from the very positive overall judgement by most of the stakeholders involved in the interview and review processes, a number of noteworthy points were raised repeatedly in the interviews and in Panel discussions. In considering and valuing these points appropriately, a more elaborate depiction of them is provided hereinafter. The following assessment is based on a synthesis of such recurring themes which reflects the Panel's perspective and position.

4.1. Research Funding Environment

In 2013 an evaluation was conducted for the other basic research funding body in Denmark, the DNRF. Two recommendations in the DNRF evaluation report were also

addressed to DFF. One of them claimed that bridging the gap between small individual and large grants in the field of humanities and social sciences is a task for DFF, not for DNRF. Another stated that senior researchers working at DNRF Centres of Excellence should not be placed at a disadvantage when applying for DFF grants.³² Both of these findings from the DNRF evaluation shall be picked up again in the Panel's considerations with regard to DFF. In its overall analysis the 2013 DNRF evaluation panel and report reached the conclusion that DNRF and DFF should remain independent funding bodies. The Panel would like to stress that it shares this position, also in view of the present review, as it is convinced that both bodies do not fulfil mainly identical but rather largely complementary roles.

With the observation in mind that the Danish research funding ecosystem can be considered healthy to a large and impressive extent, no fundamental organizational changes should be introduced for central elements of this well-functioning system. The overall equilibrium of the Danish research funding ecosystem appears to be guaranteed. For DFF and some of its practices amendments may, nonetheless, be recommendable. In a closer analysis it can also safely be assumed that DFF provides a number of support opportunities which are unique in type and style in Denmark. Whereas amendments and adaptations of some parts of these instruments and lines of support may be suggested subsequently, a generally very positive assumption has effectively been confirmed. It is against the background of these general and some of the more specific considerations below that the Panel is convinced that DFF should remain an independent funding body. It should not be merged with the DNRF as it had been discussed during the recent restructuring process which led to the establishment of Innovation Fund Denmark (IFD) in the applied research field. This being said, adaptations to further improve DFF's role could be introduced by the relevant stakeholders.

Given these general observations, the Panel takes the position that an 'adequateness' of the system's configuration can only be upheld if DFF is provided with sufficient funds to secure the health and evolution of basic research in particular within universities and, therefore, of an important part of the Danish research system. In order to fulfil its tasks in observing the recommendations from this report, the Panel expresses and shares the position that funding for DFF should clearly move beyond a phase of stagnation³³; its budget should by no means be reduced. A sustainable functioning and an appropriate equilibrium in the Danish research ecosystem's funding opportunities should thereby be created and upheld. DFF, academia, applied research, and society at large would be beneficiaries of an increased attribution of public funds to investigator-initiated independent research. The Panel is in favour of such a development. DFF could, thus, also be enabled to continuously equip Danish researchers for successful applications in the international funding context (e. g. for funds provided by the ERC). This is a crucial role to play in the larger research funding environment. DFF's supportive role in this regard is one of the expectations expressed by the ministry and other stakeholders. Therefore, DFF should be provided with a good and reasonable opportunity to live up to such expectations with the appropriate budgetary basis. The implementation of some of the recommendations by the Panel will only be possible if additional funding for DFF can be provided. The Panel suggests that this should be

32 Evaluation of the Danish National Research Foundation, report 2013.

33 See Appendix 6 on overhead policies and annual funds allocated to DFF 2004-2014.

taken into consideration when preparations are made for the medium term budgetary planning process at the Danish Parliament.

In the larger research system an appropriate balance should also be maintained between core funding provided to universities and respective additional project-based funding. The Panel considers it as crucial that, in a research environment, different actors and sources of funding are in a state of a well-calibrated and reasonably balanced interplay. A strong basis of public core funding for universities is considered an indispensable precondition for effective and successful research institutions. Third party or project-based funding can and should not be considered a substitute for this. In some thematic fields, in particular the bio-medical field in Denmark, a noteworthy availability of private funds can be observed. The strong role of private foundations and other stakeholders in this field is beneficial to the entire research system. Whereas this could be perceived as a contradiction to the plea for strong public core funding, particular resources in such thematic fields with this kind of strong additional funding should nonetheless be observed and considered when a funding decision is taken by public institutions. Eventually the most effective interplay between public institutional support and private project-based funding should be pursued and attained. A healthy coordination between the different support mechanisms would be desirable to this end and could be of benefit to the entire Danish research system.

Some groups, areas, and fields of research benefit particularly strongly from the current research support framework, whilst others are not accorded a comparable attention, treatment, and support. As one of the latter groups the Panel has identified doctoral students in Denmark. Their work is being remunerated with the expectation to contribute with their academic activities not only to the Danish research but also to the tertiary education system. Universities do, at times, struggle with the established system of remuneration for such doctoral researchers as the cost for the positions is relatively high and largely comparable to that of the more advanced postdoc positions. At the same time it is mainly for the universities to fund doctoral projects from a share of their block funding. There is currently no specific agency for individual PhD funding in Denmark. But a strong level of support in this area is generally considered an important precondition for a successful and sustainable research ecosystem by the Panel.

The distribution of funding within universities is also of relevance when it comes to DFF's support for independent researcher-initiated projects. A considerable share of the funds granted is hereby earmarked as overhead costs. Such funds are to be used for the general university support of the specific research initiatives. Areas of investment for these funds can among others include costs for infrastructure, instruments and instrument usage, departmental and faculty services, or other university support. For DFF the current percentage of overhead costs is at 44 % of the grant amount which goes towards the projects' direct expenses. In the Danish system the funds are attributed by the universities to the respective areas in relatively large autonomy. For the time being, there are no specific requirements or obligations which are extended by DFF in relation to the overhead payments. This practice leads to the situation that universities are using the received funds in diverse and non-specified ways. The Panel generally supports the autonomous decision-making by the respective university leadership. But the communication about the actual use of such funds which have been raised by the researchers and are administered by the universities should also be transparent.

Researchers, as the initiators and primary beneficiaries of such funding, have a justified interest to be well-informed about the current practices and regulations for the use of that share of the overall funds. This could particularly be taken into consideration in the communication activities of the universities themselves. A responsible autonomous role of and decision-making by universities should serve as a solid basis for their work in this field and an informed attribution of overhead funds in the future.

Another major challenge for universities is to provide and maintain the infrastructure required for internationally competitive research projects. In the more instrument-prone sciences and research projects overhead costs often only cover a share of their costs incurred. This can lead to the situation that highly qualified and talented researchers choose an alternative institution to conduct their research where access to the relevant infrastructure can be guaranteed.

Until 2011, DFF financed part of the Danish research infrastructure. This role along with the respective funds was transferred to the Minister who allocates the funding upon the recommendation by the National Committee for Research Infrastructure (NUFI). In a 2011 system-wide roadmap, 19 consensual and landmark type infrastructure projects were agreed upon by research stakeholders in Denmark. This agreement led and still leads to the establishment of at least some of the necessary infrastructure installations. With this roadmap in place since 2011 and excluding the investments in the European Spallation Source (ESS), the regular infrastructure funding level has been reduced quite considerably to approximately DKK 45 million (EUR 6 million) per annum. Roadmap projects for research infrastructure similar to the 2011 initiative should be made possible in the future. With the necessary funds provided to them by the government, these could, in particular, be supported by public funding bodies like DFF, IFD, or DNRF. They could partly provide an additional infrastructure contribution to the projects or centres which are granted by them. To this effect, an agreement should be reached amongst the three funding institutions. At the same time, universities should not be left with the impression that infrastructure, instrument usage costs, etc. are provided beyond their budgetary responsibility; they should rather also be reminded of their role and basic contribution to make.

Universities with a strong profile in the technical and natural sciences can be considered to be comparatively strong acquirers of additional funding from DFF supported projects. This is contrasted by the fact that additional (infrastructure) costs incurred for the conduct and completion of projects in these disciplines are often high as well. Scientific instruments or the charges for their use are particularly relevant for research in such fields. Specific support mechanisms should be developed and offered for specialised research units by the public funding bodies.

The Panel considers it also important to mention that obtaining funding for research in the humanities and the social sciences can be almost impossible if it is not provided by a public institution like DFF or similar funding bodies with an accepted societal role. Funding in these fields should not be reduced or negatively impacted as a consequence of a more coordinated support for infrastructure cost by the public funding bodies.

4.2. Governance and Management

The description of DFF's underlying structure and working procedures has shown that it is governed in a heterogeneous design. With its Board and the subject-specific research councils it can rely on a self-owned assessment and decision-making structure. At the same time, the members of both the Board and the subject-specific councils are appointed by the Minister who has a number of more substantive possibilities to impact on DFF activities in addition to this role. One of these possibilities is institutionalised through the fact that the DFF Secretariat is based within DASTI, an agency of the ministry. This structural layout came as a surprise to the Panel, particularly since both other public funding bodies, DNRF and IFD, have independent administrations which are not institutionally governed by the respective ministries. It appears to the Panel that this combination of various rights and competences can possibly lead to an undesired closeness between the Ministry of Higher Education and Science on the one hand, and DFF on the other. It is understood to be a challenge for DFF to develop its independent institutional identity in such a setting. A stronger independence of DFF from the ministry and the general sphere of political decision-making is considered important for its reputation as well as for long-term effective basic research support. As described above, autonomy is an important precondition for successful independent research support.

The Panel would like to stress that it should be guaranteed that an appropriate distance between the two bodies is secured and clearly defined at all times. Meanwhile, a Memorandum of Understanding (MoU) has been agreed upon by DASTI and DFF. The MoU came into effect on 1 April 2014 and is a good step into the proposed direction. Nonetheless, the Panel takes the position that an even more meticulously defined distance between both institutions, the Ministry and DFF, just like a perspective of complete disintegration should seriously be considered for the future.

A clearer separation of both sides, the ministry and DFF, could contribute to raising the necessary level of credibility for DFF in providing its support. Such clarity would also allow for clearer and more self-conscious communication activities by DFF which could further contribute to an accrued institutional identity.

In the absence of a well-developed communication strategy the general perception of DFF's work stands in no satisfactory relation to its large substantive achievements. The Panel strongly suggests to DFF to follow an improved and future-oriented communication approach including the clear description of its role and strategy in the Danish research system to strengthen its (external) perception and outreach. A good starting point for this could be the recruitment of additional communication staff or consultants to assist the current consultant. In this regard it would also be desirable that DFF establishes an independent, visibly self-owned website and online presence as an additional concrete step.

With regard to the competences and procedures for the appointment of subject-specific council and Board members, some uncertainty has been observed among DFF stakeholders as to which procedures are applicable. More clearly defined and communicated rules and procedures would be considered a recommendable improvement of the status quo. The impression of an interdependence of the institutional affiliation of council members and the share of grants provided to respective universities should also be avoided at all times and by all means in the future to further build and preserve

DFF's credibility. The rules of procedure for the respective appointment processes should, in addition to existing more general provisions in the Act on research consulting, etc., ideally be laid down in a specifically designed agreement between the Ministry and DFF. They should, furthermore, actively be communicated to the research community to create a clear, transparent, and unambiguous basis for any membership decisions to come. It would be advisable to see to a good representation of researchers from *all* relevant Danish universities (of Danish and other nationality) in the subject-specific councils and the Board.

The overall membership of the subject-specific councils is currently composed of 75 established researchers of which 51 are male and 24 are female. Of this total, 25 members come from the University of Copenhagen, 15 from Aarhus University, 9 from the Technical University of Denmark, 6 from the University of Southern Denmark, and 6 are international members. Other universities, research institutions, hospitals or private companies are represented with three or less members in the subject-specific councils only.

It also seems desirable to avoid the provision of more than a maximum of two subject-specific council chairs per university at a time. With all of this in mind, the Panel is convinced that outstanding scientific competence has to remain the primary criterion for selection which should be reflected in any possible rules of procedure, which would define the membership situation more clearly.

The subject-specific research councils are to take action when it comes to the selection of projects which researchers have put forward in applying for funding. All five research councils cover a particular field of academia. Already this distribution of specific applications to one 'competent' council can be a challenge. In addition to this, cross- or interdisciplinary research projects are more and more commonly a part of standard applications. The appropriate attribution of the latter projects to specific councils may at times be extremely difficult. Therefore, a 'matrix committee' has been put into place within DFF to fulfil the challenging task of an appropriate attribution. The interface between the five councils gathered under the DFF umbrella should be further developed. The DFF Board should implement additional processes to address the challenge of appropriately allocating and treating cross-disciplinary research proposals. The Panel suggests that a more dynamic attribution of resources to the respective councils and/or a more extensive use of review panels with multi-disciplinary representation could be considered. There can be an inherent risk in the attribution of specific research proposals as well: Some of the projects may have their strengths in fields which do not lie in the sphere of highest expertise of the respective council designated for their review. Some may have their strength in the cross-/inter-disciplinarity aspects as such.

Different researchers will regularly have differing views on individual research proposals. This is a difficulty and a general challenge which is inherent to all selection processes for research funding. In the case of DFF it should be clarified in which way the selection procedures differ for different subject-specific councils. It is of highest importance that applicants are well informed and aware of any such differences. The Panel concludes that it could be reconsidered if the current format with five subject-specific councils, which researchers regularly still perceive as independent entities, responds appropriately to the more recent and upcoming academic developments. The Panel

recommends that the shape and disciplinary fields of the five research councils should at regular intervals of 5 or 6 years be adapted in accordance with the prevalent dynamics of science and scholarship.

For the majority of DFF funding instruments the selection of research projects through the subject-specific councils has increasingly been supported through external peer review throughout the last years. This may be the case in the form of individual reviews or through review panels. The expertise provided by external academic experts is to support the funding decisions eventually taken by the councils. The number of panels varies from three to eight for the respective subject-specific councils. Panels and reviewers are selected before the applicants and applications are known. For applications of council members themselves, it is of utmost importance that external reviews continue to be regularly conducted.

Applying researchers and other stakeholders should be well-informed of the respective practices and procedures through an appropriate level of communication. The level of inclusion of external reviewers in selection processes should be high. The practice in this regard should be consistent. The Panel recommends that only postdoc grant reviews should be excluded from this approach. Their selection should ideally be conducted in a process involving personal presentations and interviews in order to appropriately respond to their early career stage.

After selection processes have been completed, rejected applicants should as a rule be provided with the opportunity to inquire about an elaboration of the reasons for the negative decision of DFF with regard to their respective research proposal, in addition to the formal rejection letter. This is considered of high relevance by the Panel in order to guarantee an appropriate degree of feedback and transparency of DFF. Wherever this does not yet exist, the Panel suggests that a standard procedure should be introduced to provide the applicants with constructive feedback which can subsequently benefit their career development. An appropriate level of transparency should be maintained at any time with regard to the selection procedures and results. It is also considered useful to include the transparent and open communication of overall selection statistics. This could be in the form of anonymous lists indicating the respective funding benchmark which had to be surpassed to successfully obtain funding.

In a general observation, the Panel points to the fact that the level of rejected applications in the DFF selection process is very high. At present success rates for obtaining one of DFF's grants range at approximately 15 %. On the one hand, the high level of rejections may form some of the basis for the high quality of projects selected and supported. On the other hand, the same rejection rate can become a burden to and even hinder excellent researchers to invest the necessary effort to draft and submit a research proposal, as they may consider their chances too low to even invest in such efforts. The rate can form too high a threshold to be surmounted by applicants already in the initiation phase of an application. The Panel recommends that DFF should pursue the ambition to increase the number of successful grant applications to a level slightly above 20%. This aim can only be achieved if a sufficient (and increasing) level of funding for DFF is provided by the government.

4.3. DFF's Funding Practice

As an important result of the evaluation the Panel would like to emphasise that many of DFF's overall efforts, the level of intensity of the work conducted by researchers serving as members of subject-specific research councils, just like the many high quality selections completed are extremely laudable. DFF's work and effort in those regards merit the highest recognition. The outstanding role of DFF with its quality-driven review of independent investigator-initiated project proposals in the Danish research funding ecosystem should be upheld by all means. To be selected for DFF funding is generally regarded as an important step in successful Danish research careers. A positive selection is considered to be a 'quality stamp'. The Panel observes that this is widely accepted and highly appreciated throughout the academic community in Denmark, and it shares this view with great emphasis.

A particular field of importance for the overall Danish academic landscape is that there is a sufficient breadth and availability of support mechanisms addressed to radically innovative research in the basic research field. For the development of academia such ideas are of fundamental relevance. They can serve as a stimulus for new perspectives and even new or adapted fields of research to emerge. The Panel recommends that a specific 'small grants' funding instrument could be introduced to support high risk proposals and radically new and possibly daring ideas. It should be considered to allow that applications for this type of small-scale funding can be transmitted in a simplified process and be possible even prior to proof of concept. Such a line of support could ideally turn out to become a cradle for fundamentally new thought and approaches leading the way into an emerging field of research with great potential for the future.

This future will be shaped and influenced by the young and aspiring research talents. A particularly important time for young researchers to evolve and take crucial steps in their careers often occurs after the completion of the second postdoctoral stage. It is regularly also at this point that obtaining a grant becomes a decisive self-owned responsibility of the young researchers. DFF's support at this stage can be a crucial asset for the continuation of an individually successful academic career. DFF's responsibility includes to avoid suggesting future perspectives to those researchers, who have not attained a sufficient proficiency in their work at such a point. With this responsibility in mind, high quality and substance-driven review and evaluation of project proposals should come to their fullest and most thorough application like in all other selection procedures. Funding decisions taken by DFF in this individually important phase of professional evolution can eventually have an impact on aspiring researchers' professional careers and personal lives. The sound attribution of funds can also benefit the overall evolution of the Danish research ecosystem.

In relation and in addition to this, the Panel recommends that utmost priority should be attributed to the support of highest quality researcher-initiated projects, particularly for applicants who are early in their career, including assistant professors in disciplines where the assistant professorship is obtained after several years as a postdoc. Still at this level it can be considered that funding and, in particular, career and tenure perspectives are fundamental for the researchers' professional and personal evolution. A research grant concept which is notably directed towards individual researchers should be further developed and strengthened for this stage.

DFF's support is provided via different funding instruments. The Sapere Aude programme is at the centre of activities. With the introduction of this instrument the Council has been able to underline its far-sight and vision in performing its designated role. It should be an ambition for the future to keep this well-diversified funding programme at the core of DFF's funding activity. At the same time, further improvements and refinements to the design of Sapere Aude should remain a central interest of DFF.

Sapere Aude step 3 grants are often made to established researchers with numerous funding options at hand (e. g. from DNRF or ERC). The funding line is directed at researchers at a full professorship level with the qualifications to lead a research team according to the highest international standards. Given DFF's limited overall funds, the extent to which such a support is provided should be considered with great caution. This is true in both a general sense and with regard to the funds available to DFF as the Sapere Aude step 3 level offers the highest volume of support which DFF provides.³⁴ With their financial volume and structure, the Sapere Aude step 2 grants offer the possibility of being transformed into a more flexible funding line. The grants are directed at researchers who are ready to lead their own research team, but who have not necessarily attained professorship level yet. Their adaptation could serve to better support entry level professorships, to create tenure opportunities, and to further the development of sustainable academic careers. Already at an early stage, this type of support should closely be coordinated with universities in the respective selection and support process. Such inclusiveness would favour the well-founded effectivity of this type of support. An opportunity may be created to develop an endowment and/or tenure option together with the respective universities. This should be dependent on the university's ability to contribute with additional (third party) funding. Such a programme line could serve as an alley of securing the sustainability of DFF's support for those researchers who had previously initiated projects of highest quality beyond DFF support. Flexibilisation of this kind would depend on DFF's initiation and the universities' readiness as well as activity in attracting third party funding or allocating other resources to the continuation of initially DFF-funded researchers and projects. Through such an approach, researchers could ideally be helped to longer-term, more reliable, and sustainable funding. Strengthened possibilities *inter alia* for female researchers could additionally be included in such a scheme. The Panel takes the position that this should be applied and would be helpful, in particular, for young researchers who may not have reached a full professorship level yet.

In more general terms, the Panel would like to suggest that a review of the duration of funding periods should be considered. Longer-term funding for a period of up to five years can favour risk-taking. This, for its part, can be the basis for a successful evolution of the entire research ecosystem. Researchers could, thereby, be enabled to pursue their respective projects in a focused manner without the obligation to prepare new funding proposals at short intervals. Any more general extension of funding periods should be linked to the requirement of an additional consultative stage for the respective research projects. A 'mid-term' status symposium or an international research conference could serve this purpose. By introducing such an obligation, for which addi-

³⁴ In 2013 the average grant size of Sapere Aude step 3 grants was at approximately DKK 11.3 million compared to DKK 6.7 million for Sapere Aude step 2 grants, and DKK 9.1 million for stage 3 Research Projects.

tional funding should be provided as part of an initially granted budget, grant holders would be encouraged to reconsider and improve the quality of their work.

Longer-term more reliable funding will as a rule have to be based on intense consultation and collaboration with the potentially affected universities. An active exchange with them already during the selection process should be considered an important precondition for success. Such an exchange could serve a better understanding of their capacity and willingness to host respective research projects and to cover additional costs which may potentially be arising. This type of funding could eventually become a flagship funding line offered by DFF. At the same time, a clear differentiation from the DNRF funding of research centres should be maintained. This is of particular importance as a considerable similarity between them and the Sapere Aude step 3 grants can already be observed. An amendment of the Sapere Aude funding instrument as described could also serve as a cornerstone for an independent communication strategy and activity by DFF. The Panel is convinced that it could not only in this regard be beneficial for DFF's role in the Danish system.

4.4. Specific Areas of Consideration

As part of its funding activities, DFF is confronted with some inherent challenges in areas which are of concern to most research environments. The Panel would like to emphasise that in such spheres even the best programmes of funding institutions can only be successful with a correlating mind-set at all levels of the wider research system. DFF's role can only be that of an indirect contributor to the resolution of this type of issues. This is notably the case for questions relating to the gender ratio just like to mobility in the Danish research community.

With regard to female representation in Danish academia a scissor diagram can be observed: From the first entry into tertiary education up to higher level positions female and male participation is reversed. The Panel takes the position that the gender ratio in Danish research does not live up to reasonable expectations. This is in particular the case for senior level research positions. The Panel, therefore, recommends that DFF should actively attempt to contribute to a shift away from this status within its dedicated realm. Stronger, more flexible, and better integrated support for female researchers is strongly recommended at all levels of DFF funding and in the Danish research system at large. This particularly holds true for mobility requirements DFF may formulate and which should always encapsulate flexible support mechanisms for family and living situations of the grant holders. One of the responses DFF has already introduced in this regard is the current YDUN funding line which is only offered once. In itself YDUN cannot be considered to be a sufficient answer to this fundamental problem. But it is laudable that this project has been initiated by DFF. At the same time, the Panel considers it as insufficient and even misleading that this programme is designed as a one-year initiative only. In the pursuit of gender equality in academia, DFF should, first and foremost, focus on an integrated approach. This should probably also include a critical consideration of its own structures: The gender ratio in the current composition of its subject-specific research councils with only 24 female members – not even one third of the overall membership of 75 – stands exemplary for the systemic deficit, but should be critically addressed nonetheless.

The already mentioned mobility questions form another of the inherent fields DFF is regularly confronted with in its activities. Mobility forms part of many modern lifestyles and it can, in particular, be beneficial to academic careers. Especially early stage mobility is considered an important precondition for research success. In view of the available data and the researchers' statements, the overall level of mobility within the Danish research environment appears to be relatively low. This is true for both national and international mobility. While national mobility may at times be hindered inter alia by the requirement of specific research infrastructure only available at some Danish universities, a certain extent of mobility should be required for all younger researchers supported by DFF. The existing MOBILEX programme should be strengthened and stronger, more flexible mobility incentives should be introduced as part of the other funding instruments by DFF. In the future it should be expected from postdocs to change institutions in Denmark at least once, and to spend a part of their postdoc time abroad. DFF's mobility support should, ideally, be increased for both outgoing and incoming researchers.

Mobility should not generally be considered a burden but an opportunity for researchers. This perception should be helped by an ameliorated awareness and an appropriate, sensible, and flexible response to well-founded personal needs, ties, and responsibilities (i.e. in particular family situations). The Panel considers international exchange for and within the Danish research community as an important contributing factor to its further successful evolution in the future.

In consideration of DFF's already strong focus on supporting young researchers and early career development, specific steps should be taken to maintain and further strengthen this focus area in DFF's work. As a concrete step towards better accommodating the needs of younger researchers in particular, the Panel recommends the introduction of annual or at least biannual postdoc meetings. Such meetings assembling the entirety of DFF-supported postdocs could serve to enable and stimulate the young researchers' feedback and exchange with DFF. They would also form a good basis for an active dialogue between the young researchers about their support from DFF and other relevant aspects of their activities. Besides increased incentives for researchers' mobility, this could constitute a valuable and concrete step to strengthen ties in a national and international research environment which could be an important precondition for continuous research success in the future.

4.5. Advisory Role

In comparison to DFF's main role in research funding, its advisory function is considered by the Panel a minor component of DFF's work. This does not imply that DFF should exclusively be restricted to its funding responsibilities and actions. On the contrary, it can constitute a coherent measure and a natural part of DFF's efforts to promote its work, e. g. through research-related advice. In general it appears reasonable to maintain a sound level of interaction with the relevant stakeholders in the research and research funding fields. At the same time, the Panel takes the position that the role of providing research policy advice does not per se constitute a part of DFF's main tasks and competences. In reference to the Act on research consulting etc. in its most recent form, the Panel acknowledges that research policy advice can be requested by the Minister when required, but shall not form a general core activity of DFF's work. This is particularly assumed to be the case as the recently established Danish Council

for Research and Innovation Policy (DCRIP) was specifically mandated to provide advice in policy matters.

The Panel assumes that the latest figures of approximately 500 advisory tasks taken on by DFF both in 2012 and 2013 include a broad range of basic services which are not considered to be part of complex advisory functions but rather take the form of e. g. nominations for members of scientific review panels etc. DFF should by no means be kept from the pursuit of its own interests and their presentation in the relevant environment. The Panel, therefore, recommends that a clearer differentiation between merely scientific and activity-related services versus actual in-depth advisory engagements should be achieved. The dividing line between research consultancy and policy advice should also be continuously observed by DFF. The Panel suggests that a clear interpretation of its advisory role should also be communicated by DFF vis-à-vis researchers and the public at large. Strengths and competences in this specific advisory field attributed to DFF could therein also be described and emphasised more clearly.

5. Recommendations by the Evaluation Panel

The Danish Council for Independent Research (DFF) plays a key role in the Danish research funding system. Basic research funding for projects and fellowships is a prerequisite for a successful and dynamic research ecosystem as well as a thriving economy. In Denmark DFF is the only public funding agency that provides such support.

A particularly important aspect of the role of DFF in the Danish research funding space is that it supports research talent in a broad range of research fields at various stages of their career. The high quality standard of the projects and fellowships supported by DFF is widely recognised and highly accepted in the Danish academic landscape. To be selected by DFF is considered to be a 'quality stamp' which can be of great relevance for successful academic careers in Denmark.

The bibliometric study which demonstrates the higher citation impact of publications resulting from DFF funded projects in an already very good general research environment confirms this perception. Denmark contributes an overall high quality output of academic work. The country's strong research community not only sets standards in relative terms but is a strong challenger in the European academic environment in absolute terms.

The high level and high quality of publicly funded basic research is an important condition for maintaining and continuing to improve the position of Denmark on the European science, research, and innovation scene. The more focused funding instruments used by DFF today are suitable for the Danish requirements. The number of instruments was successfully reduced in a gradual review of the former up to 48 lines of funding.

DFF serves as an important catalyst of academic success and notably provides good conditions for younger research talent to further develop their careers. The Panel considers the contribution of DFF to the career development of younger promising researchers to be a crucial aspect of DFF's work. Whereas most of the recommendations that follow are addressed to DFF, some are directed towards the Danish Government, Danish universities, and the Danish research system at large.

5.1. Recommendations Addressed to the Danish Government and Parliament

1. The competences required and procedures used for the appointment of the subject-specific research council and Board members should be more clearly defined. The process should be laid down in a specifically designed agreement between the Ministry and DFF to avoid any concerns in this regard in the future.
2. DFF should remain an independent funding body. It should not be merged with the Danish National Research Foundation (DNRF) as had been discussed during the recent restructuring process which led to the establishment of Innovation Fund Denmark (IFD) in the applied research field. For independent research, nota-

bly for some of its specific thematic areas like the social sciences and the humanities where alternative sources of funding are very few, a public support mechanism taking into consideration proposals for all types and sizes of basic research projects is a fundamental necessity. In this role DFF develops a 'science base' and thus provides the solid foundations for the effectiveness of other funding mechanisms like the DNRF, or the European Research Council (ERC) targeted to serve researchers at more advanced career stages.³⁵ Support of unusual and innovative projects can be an important source for progress and future developments in academia, applied research, and society at large. By supporting high quality independent research at early career stages, DFF provides an invaluable contribution to the 'health' of the Danish research ecosystem.

3. The DFF Secretariat is currently based within the Ministry of Higher Education and Science. This combined with the Minister's authority inter alia with regard to the appointment of members of the subject-specific councils and the Board could lead to a problematic closeness between the Ministry and DFF. While the current structural set-up came as a surprise to the Panel (particularly since both DNRF and IFD have administrations which are entirely detached from their respective ministries), it appears to be a satisfactory *modus operandi*. Nevertheless, the Panel considers it important to ensure that an appropriate distance between the two bodies is defined and maintained at all times. A Memorandum of Understanding between DASTI and DFF to this effect has entered into force on 1 April 2014, which is a good step in the right direction. An even more clearly defined distance between the two organisations and the possibility for complete disintegration should be seriously considered in the future. Related communication activities by DFF could contribute to an accrued institutional identity which would be desirable and could only benefit its role and its cause in which autonomy is closely linked to credibility.
4. DFF should be provided with sufficient funds to secure the health and development of the Danish research system. In order to fulfil the tasks recommended by the Panel, the funding allocated to DFF should move beyond its current phase of stagnation. DFF's budget should by no means be reduced. DFF, academia, applied research, and society at large would benefit from an increased attribution of public funds to independent research. An increase of funding would not only have positive effects for the development of Danish academia, but it would also enable DFF to equip researchers with the skills and competencies necessary for success in the international funding context, e. g. for funds provided by the ERC. Furthermore, an enlarged budgetary basis would support DFF in a desirable and recommended effort to increase the number of successful grant applications to a level of at least 20 % which is viewed internationally as the minimum level for an effective funding system.
5. An appropriate balance between core funding for universities and third party or project-based funding ought to be maintained. It is crucial that in a research environment different actors and sources of funding are in a state of a well-calibrated and reasonably balanced interplay. A strong basis of public core funding for universities is a precondition for effective and successful research and research institutions. Third party or project-based funding should not be considered a substitution, but its prevalence and particular availability for some areas (like the

35 See Evaluation of the Danish National Research Foundation, report, 2013.

bio-medical field in Denmark) should nonetheless be taken into consideration for the distribution of public resources.

5.2. Recommendations Addressed to DFF

a. DFF's Position in a Future Research System

6. The outstanding role of DFF with its quality-driven review of independent researcher-initiated project proposals should be upheld. The 'quality stamp' that research funding from DFF provides to researchers is seen as an important step in successful Danish academic and research careers. This is broadly accepted and highly appreciated by the academic community in Denmark and should be maintained.
7. The underlying concept of DFF funding activities 1) to aim at the selection of high quality independent researcher-initiated projects, 2) to ensure that the grant recipients are provided with a strong degree of freedom in a high-trust research environment just like 3) the ambition to provide for well-measured basic research support at all post PhD levels is as successful as important for the Danish research ecosystem and must be upheld.
8. DFF's already strong focus on supporting young researchers and early career development should be further strengthened in order to contribute to a sustainable development of fundamental research and academia in Denmark.

b. Governance and Management of DFF

9. The level of rejected applications in the DFF selection process is very high. At present success rates for obtaining one of its grants range at approximately 15%. While this can be considered as a contributing factor for the high quality of projects selected and supported, it can also constitute too high a threshold to be surmounted by applicants. This can discourage the range and quality of the research proposals submitted. DFF should address this issue and work towards an improved situation in this regard.
10. The interface between the five subject-specific councils gathered under the DFF umbrella ought to be improved. New devices and processes to address the challenge of appropriately allocating and treating cross-disciplinary research proposals should be developed by the Board on top of the existing mechanisms. The 'matrix committee' for inter-disciplinary selection is a first constructive step to address this challenge. Further steps could be a more dynamic attribution of resources to the respective council and/or a more extensive use of review panels with multi-disciplinary representation. It should also be clarified, if the selection procedures are the same for all five subject-specific councils and/or in which way they differ purposefully and in response to possible specific disciplinary requirements. The shape and disciplinary fields of the subject-specific councils should reflect the dynamics of science and scholarship.
11. The advisory role of DFF should be reconsidered: While it is a coherent measure and part of DFF's efforts to promote its work with research-related advice and while it appears reasonable to maintain a sound level of interaction with the relevant stakeholders in this field, the role of providing research policy advice does not per se form part of its prescribed competences as set out by the Act on research consulting etc. in its most recent version. Research policy advice can be requested by the Minister when required, but should not form a general core activity of DFF's work. This is not to say that DFF should be kept from the pursuit of its own inter-

ests and their presentation in any way. But a clear differentiation between scientific or science-related services and an actual in-depth advisory role should be achieved. This should also be reflected in a clear communication strategy vis-à-vis researchers and the general public which would be welcomed by the Panel.

c. DFF Funding Instruments

12. With the design of the Sapere Aude programme DFF has underlined its far-sight and vision in performing its designated role. The needs-oriented, well-diversified instrument should remain at the core of DFF's funding activity. In order to further develop this already strong funding programme, some of the recommendations below are directed towards it and should be considered specifically for refining the Sapere Aude instrument of support.
13. An important time for young researchers to evolve and take crucial steps in their careers is after the completion of the second postdoc stage. Obtaining support from DFF at this point can be a crucial asset for the continuation of an individually successful academic career just like it can benefit the overall evolution of the Danish research ecosystem. An appropriately high number of postdocs is considered a vital basis for a strong research landscape. Particular attention should, therefore, be accredited to this field of support.
14. It should, in relation and in addition to this, be of the highest priority that high quality researcher-initiated projects are supported in particular for those researchers who are early in their career, including assistant professors in disciplines where the assistant professorship is obtained after several years as a postdoc. A research grant concept notably directed towards individual researchers should be strengthened for this career level. Furthermore, the Panel considers as advisable the introduction of new incentives for tenure options as part of the respective higher level funding instruments like Sapere Aude step 2 and 3 grants.
15. A review of the duration of funding periods should generally be considered. Longer-term funding for a period of up to five years can favour more risk-taking just like it can allow for researchers to pursue their respective projects in a focused manner without the detraction caused by the preparation of new funding proposals at short intervals. A 'mid-term' status symposium or international research conference could in this case be required of the researcher to prove the quality of the work conducted. Additional funding for organising and hosting such a mid-term symposium/research conference should be provided as part of an initially granted budget.
16. For longer-term more reliable funding, it will be important to involve and consult the potentially affected universities during the second stage of the selection process in order to have a good understanding of their capacity and willingness to host respective research projects and to cover potentially arising additional costs. This type of funding could eventually be considered and communicated as being a flagship funding line by DFF. The clear differentiation from DNRF funding of research centres (CoEs) should be maintained; especially as a considerable similarity between them and the Sapere Aude step 3 grants can be observed.
17. Sapere Aude step 3 grants are often granted to established researchers with numerous funding options (e. g. from DNRF or ERC) at hand. Given DFF's limited overall funds, the extent of providing such support should be considered with great caution. At the same time, Sapere Aude step 2 grants could be amended to become a more flexible funding line with strengthened possibilities inter alia for female

researchers and extended funding periods. This adaptation could serve to better support entry level professorships and the development of sustainable academic careers. In order to guarantee the well-founded effectivity of this type of support, universities should be included in the respective selection and support process already at an early stage. An endowment/tenure option may be offered as an alley of securing the sustainability of such support if the conducted research is deemed to be of highest quality and the respective universities are able to contribute with additional (third party) funding.

18. It is of utmost importance for the overall Danish academic landscape to support radically innovative research in a fundamental research environment. Risk-taking by researchers may be inspired by opening up more reliable funding options as described above. It may particularly be stimulated by a specific 'small grants' funding instrument introduced to support high risk proposals and radically new and possibly daring ideas (even before proof of concept).
19. Early stage mobility is considered an important precondition for research success. In view of the available data and the researchers' statements, the overall level of mobility within the Danish research environment (nationally and internationally) appears to be relatively low. This should be counteracted by strengthening the existing MOBILEX programme and by introducing stronger and more flexible mobility incentives as part of the other funding instruments provided by DFF. It should in the future be expected from postdocs to change institutions in Denmark at least once and to spend a part of their postdoc time abroad. Both outgoing and incoming researchers should benefit from an increased mobility support. Family and other well-founded matters of personal concern should be taken into consideration in order to be able to respond to them in a sensible and flexible manner.

d. Transparency and Conflict of Interest Policy

20. Several stakeholders expressed their concern that there could be a correlation between the institutional affiliation of the subject-specific council members and the share of grants provided to respective universities. This would have a strong negative effect on the legitimacy of DFF and measures to correct it should be introduced. The Panel believes that one such measure is to ensure a good representation of researchers from all Danish universities and to avoid the provision of more than a maximum of two subject-specific council chairs per university at a time. Nevertheless, outstanding scientific competence has to remain the main criterion for selection.
21. It remains unclear, what policy is being followed with regard to the increasing inclusion of external reviewers in the application review processes. There should be a consistent and well-communicated practice with a strong involvement of external reviewers for proposals submitted. Only postdoc grant reviews should be excluded from this approach; they should ideally be selected in a process involving personal presentations and interviews in order to appropriately respond to their early career stage.
22. To guarantee an appropriate degree of transparency, applicants should as a rule be provided with the opportunity to inquire about the reasons for the (negative) decision of DFF with regard to their research proposal, in addition to the formal rejection letter. Wherever this does not yet exist, a standard procedure should be introduced to serve a constructive feedback which can subsequently benefit the further career development and considerations of the principal investigators (PIs).

An appropriate level of transparency must be maintained at any time; this includes the transparent and open communication of overall selection statistics (e. g. in an anonymous list format indicating the funding benchmark).

e. Communication and External Perception

23. Many of DFF's overall efforts, the level of intensity of the work conducted by researchers serving as members of subject-specific councils, just like the many high quality selections completed are laudable. This work merits the highest recognition. In the absence of a well-developed communication strategy the general understanding and perception of DFF's work stand in no satisfactory relation to its substantively founded large achievements. The Panel strongly suggests for DFF to follow an improved and future-oriented communication approach including the clear description of its strategy and role in the Danish research system to strengthen its (external) perception and outreach.
24. The introduction of annual or at least biannual postdoc meetings within DFF should be considered to enable and stimulate the young researchers' feedback and exchange with DFF just like an exchange with their peers.

5.3. Recommendations Addressed to Universities

25. There is currently no specific agency for PhD funding in Denmark. Funding for doctoral projects is mainly distributed by universities from a share of their block funding previously earmarked for this purpose. A strong level of support in this area is an important precondition for a successful and sustainable research ecosystem.
26. In the current funding layout there is no requirement for universities to report with regard to their actual use of the currently 44 % overhead costs regularly taken off the funding granted to individual PIs in order to support the institutions. While the clear and concise regulation and communication of the attribution and distribution of these funds within the universities to their faculties, departments, staff etc. would be desired, it is primarily for them to establish and guarantee this internally in an 'efficiency through autonomy' approach.
27. Across Europe one of the major challenges for universities is to provide and maintain the infrastructure required for highest level research projects. Universities cannot be expected to carry the sole responsibility for infrastructure costs. They should rather be supported by other public funding sources and, in particular, bodies like DFF, IFD or DNRF as well as the funds allocated by the Minister on the recommendation from NUFU (cf. recommendation no. 31 below). Notwithstanding this responsibility of the wider Danish research system, infrastructure coverage, especially instrument usage costs, should to an appropriate extent be provided by universities in making use of their basic funding and additional resources for this purpose.
28. The variance of what level of contributions universities can secure in additional funding to add to DFF grants is considerable. At least those universities aiming to be top research institutions should aspire to reach out to a multitude of funding sources and broadly diversified support alleys. This should notably include international and European funding opportunities (e. g. the ERC) for which DFF aims to stimulate a high success rate among its (former) grantees.

5.4. Recommendations Addressed to the Wider Danish Research System

29. The gender ratio in Danish research does not live up to reasonable expectations. This holds true in particular for senior level research positions. With regard to the development of female participation in higher education and research, a scissor diagram can be observed, encapsulating the fact that from the first entry into tertiary education up to higher level positions in academia the ratio of female and male representation is reversed. Stronger, more flexible, and better integrated support for female researchers is strongly recommended at all levels of DFF funding and in the Danish research system at large; the one-year YDUN funding line is no sufficient answer to this fundamental problem. Even the best funding programme in support of gender equality can only be successful with the correlating mind-set at all levels of the wider research system.
30. Mobility should not generally be considered a burden but an opportunity for researchers as it forms part of many modern lifestyles and it can, in particular, be beneficial for academic careers. An awareness and appropriate response to well-founded personal needs, ties, and responsibilities (i.e. in particular family situations) should be observed in order to allow for sensible and appropriately flexible responses.
31. In a 2011 roadmap, 19 consensual and landmark type infrastructure projects were agreed. The current regular infrastructure funding level has been reduced to approximately DKK 45 million (EUR 6 million) per annum (excluding the investments in ESS); this is no more than a drop in an academic ocean. In particular experimental and instrument-prone research, where overhead costs are generally considered to range at a level beyond 100% of the actual research project's cost, are confronted with serious challenges. This is especially the case when its researchers collect a very high amount in grant money. Costs should partly be covered, if and in as far as required for the projects supported, by the three current Danish public funding bodies (cf. recommendation no. 27 above) in accordance with an overarching agreement to be established between them.
32. A general awareness for the high variance of universities' potential and abilities to generate additional co- and third party funding should be maintained. Universities with a strong profile in the technical and natural sciences can generally be considered to stand good chances in the acquisition of additional funding to help conduct DFF supported projects. At the same time, the additional (infrastructure) costs incurred for the conduct and completion of research projects in these disciplines is often high due to the regular need for expensive instruments or the charges for their use. On the other hand, it should not be neglected that funding for research in the social sciences and the humanities can be nearly impossible to obtain, if it is not provided by a public council for basic research like DFF or similar general funding bodies directed towards a long-term benefit for society.

Appendix 1: Members of the Evaluation Panel

Dr. Wilhelm Krull, Secretary General of the Volkswagen Foundation, Hanover, Germany (Chair).

Dr. Suzanne Fortier, Principal and Vice-Chancellor of McGill University, Former President of the Natural Sciences and Engineering Research Council of Canada, Montreal, Canada.

Dr. Maria Nedeva, Professor of Science and Innovation Dynamics and Policy, the University of Manchester, The United Kingdom.

Dr. Christoph Kratky, Professor at the Institute of Molecular Biosciences at University of Graz, Former President of the Austrian Science Fund, Austria.

Dr. Andreas Seidel-Morgenstern, Director of Department of 'Physical and Chemical Foundations of Process Engineering' at Max Planck Institute (MPI) for Dynamics of Complex Technical Systems in Magdeburg, Germany.

Dr. Peter Nijkamp, Professor in Regional Economics and in Economic Geography, Faculty of Economics, Free University, Amsterdam, The Netherlands, President Governing Board Netherlands Research Council (NWO), The Netherlands, Former President of the European Heads of Research Councils (EUROHORCS).

Academic Secretary

Jonas Burghelm, Former Member of Staff at Volkswagen Foundation, Hanover, Germany, Programme Officer – Policy and Projects, United Nations, Geneva, Switzerland.

Appendix 2: Documentation Available to the Panel

Documentation Provided by the Danish Ministry of Higher Education and Science

- Note, Introduction to the Danish Research and Innovation System, 2014
- Note, Supplementary comments to the DFF self-evaluation, by the Ministry of Higher Education and Science, 2014
- Abstract: Evaluation of the Advisory and Funding System for Research, 2009
- Evaluation of the Danish National Research Foundation (including bibliometric analyses), 2013
- Danish Roadmap for Research Infrastructure, 2011
- Comparing Research at Nordic Universities using Bibliometric Indicators, 2014
- Note on the distribution of block funding for universities, 2014
- Note on DASTI funding of research infrastructure, 2014
- The National Committee for Research Infrastructure
- Memorandum of understanding on the Danish Agency for Science, Technology and Innovation's secretariat services for the Danish Council for Independent Research (DASTI's services to DFF), 2014
- ERAC Peer-review of the Danish Research and innovation system, 2012
- Press-release regarding the Danish Council for Research and Innovation Policy, 2014
- Note on Innovation Fund Denmark – board appointed, 2014
- Fostering breakthrough research: A comparative study, 2012
- Research and Innovation Country profile Denmark, 2013
- General overview of the public support system for research and innovation, 2014
- Act on research consulting, etc.
- Note on researchers' mobility, 2014.

Documentation provided by DFF

- DFF Self-evaluation report, 2014
- Note on Number of advisory tasks, 2014
- Note and examples on feedback to rejected applicants (mainly postdoc), 2014
- Note on criteria and procedures for appointing members of DFF, including list of council members distributed on the 8 universities, 2014
- Note on DFF coordination activities in relation to other bodies (mainly DNRF and Innovation foundation), 2014
- Note on DFF outreach and communication activities, 2014
- Binding guidelines on disqualification in respect of the practice of the funding function by the Danish Councils for Independent Research and the Danish Council for Strategic Research, 2007
- Note on selection procedures in DFF, 2014
- Note on use of International peer review in DFF, 2014.

Statistics:

- Distribution on institutional type (number of grants, applications, applied amount, amount awarded)
- Cross council applications
- Applications and grants distributed on instruments and gender
- Age distribution on success rates
- Success rates for Danish Universities in DFF
- Danish Universities performance in FP7
- Statistical preparedness (including a more detailed division of each university's external funding).

Appendix 3: Interview Partners of the Evaluation Panel

Aarhus University

- Berit Eika: Pro-Rector, Professor
- Johnny Laursen: Dean, Arts, Professor
- Niels Chr. Nielsen: Dean, Science and Technology, Professor
- Allan Flyvbjerg: Dean, Health, Professor
- Svend Hylleberg: Dean, School of Business and Social Sciences, Professor
- Mikkel Thorup: Associate Professor, Arts
- Kim Daasbjerg: Professor (WSR), Science and Technology
- Lis Wollesen De Jonge: Professor (WSR), Science and Technology
- Marianne Simonsen: Professor, School of Business and Social Sciences
- Søren Riis Paludan: Professor (WSR), Health
- Signe Normand, Assistant Professor, Science and Technology
- Nikolaj Zinner, Associate Professor, Science and Technology
- Francesco Violante, Assistant Professor, School of Business and Social Sciences
- Nina Kerting Iversen, Assistant Professor, Health
- Kasper Green Krejberg, Postdoc, Comparative Literature.

Aalborg University

- Per Michael Johansen: Rector
- Eskild Holm Nielsen: Dean, Faculty of Engineering and Science
- Kim Dremstrup: Head of Department, Faculty of Medicine
- Hanne Kathrine Krogstrup: Dean, Faculty of Social Sciences
- Lone Dirckinck-Holmfeld: Dean, Faculty of Humanities
- Petar Popovski: Professor (WSR), Faculty of Engineering and Science
- Ole Kæseler Andersen: Professor, Faculty of Medicine
- Poul Duedahl: Professor (WSR), Faculty of Social Sciences
- Peter Stein Larsen: Professor, Faculty of Humanities
- Marie Frederiksen, Postdoc, Faculty of Engineering and Science
- Afshin Samani, Assistant Professor, Faculty of Medicine
- Morten Frederiksen, Postdoc, Faculty of Social Sciences
- Christian Ydesen, Assistant Professor, Faculty of Humanities.

University of Southern Denmark

- Bjarne G. Sørensen: Pro-rector and appointed University Director ad interim
- Henrik Pedersen: Dean Faculty of Science, Professor
- Ole Skøtt: Dean, Faculty of Health Sciences
- Nicolai Malchow-Møller: Faculty of Business and Social Sciences, Professor, Head of Department
- Horst-Günther Rubahn: Dean, Faculty of Engineering, Professor
- Simon Møberg Torp: Dean, Faculty of Humanities
- Jeppe Kristensen: Project manager, SDU Grants Office
- Nina Dietz Legind: Professor (WSR), Department of Law
- Susanne Mandrup: Professor, Department of Biochemistry and Molecular Biology

- Nils J. Færgeman: Professor, Department of Biochemistry and Molecular Biology
- Michael Bregnsbo: Associate Professor, Department of History
- Gisela Hostenkamp: Postdoc, Department of Business and Economics
- Luciana Tavares: Postdoc, Mads Clausens Institute, (Mechatronics).

University of Copenhagen

- Ralf Hemmingsen: Rector, Professor, Chair of Universities Denmark
- Thomas Bjørnholm: Prorector for Research and Innovation, Professor
- Ian David Hickson: Professor, Faculty of Health and Medical Sciences
- Morten Michelsen: Associate Professor, Faculty of Humanities
- Anna Vind: Professor (WSR), Faculty of Theology
- Vibe Garf Ulfbeck: Professor, Faculty of Law
- Karen Lund Petersen: Associate Professor, Faculty of Social Sciences
- Tuomas Oskari Kilpeläinen: Assistant professor, Faculty of Health and Medical Sciences
- Karen Asta Arnfred Vallgård: Assistant professor, Faculty of Humanities
- Maria Elisabeth Engell Jessen: Postdoc, Faculty of Theology
- Louise Victoria Johansen: Postdoc, Faculty of Law
- Tone Roald: Assistant professor, Faculty of Social Sciences
- Lars Behrendt: Postdoc, Faculty of Science.

Technical University of Copenhagen

- Henrik C. Wegener: Provost, professor, Executive Vice President
- Claus Henrik Andersen: Head of Department, Research and Relations
- Ib Chorkendorff: Professor, DTU Physics, Department of Physics
- Birte Svensson: Professor, DTU Systems Biology, Department of Systems Biology
- Jan Henrik Ardenkjær-Larsen: Honorary Professor, DTU Elektro, Department of Electrical Engineering
- Søren Hauberg: Postdoc, Department of Applied Mathematics and Computer Science Cognitive Systems
- Starrlight Augustine: Postdoc, DTU Aqua, National Institute of Aquatic Resources, Centre for Ocean Life
- Marie Lund Traulsen: Postdoc, DTU Energy Conversion, Department of Energy Conversion and Storage.

IT University of Copenhagen

- Jørgen Staunstrup, Pro-rector
- Rasmus Pagh, Professor, Theoretical Computer Science.

Roskilde University

- Hanne Leth Andersen, Rector
- Peter Kjær, Pro-Rector
- Kim Christian Schrøder, Professor, Communication, Journalism and Social Changes

- Peter Westh, Professor, Nature, Systems and Models / Chemistry
- Garbi Schmidt, Professor (MSO), Intercultural Studies / Culture and Identity.

Copenhagen Business School

- Alan Irwin, Dean of Research
- Susana Borrás, Head of Department of Business and Politics
- Peter Møllgaard, Head of Department of Economics
- Christian Borch, Professor, Department of Management, Politics and Philosophy
- Eva Boxenbaum, Professor, Department of Organization
- Jimmy Martínez Correa, Assistant Professor, Department of Economics
- Jens Dick-Nielsen, Associate Professor, Department of Finance.

Additional interview partners

- Jens Maaløe, President and CEO, Terma A/S, Chair of the Research Committee of the Confederation of Danish Industries, Vice Chair of Innovation Foundation Denmark (and Chair by 1 January 2015)
- Jens Oddershede, Professor, dr.scient, Department of Physics, Chemistry and Pharmacy, University of Southern Denmark, Chair of Danish Council for Research and Innovation Policy, former Rector of University of Southern Denmark, former Chair of Universities Denmark (the confederation of the eight Danish Universities)
- Peter Kurtzhals, Chair of Research Policy Committee of Danish Association of the Pharmaceutical Industry
- Jesper Allerup, Chief consultant of Confederation of Danish Industries.

Danish National Research Foundation

- Thomas Sinkjær, Director of The Danish National Research Foundation, University of Copenhagen.

Private foundations

- Flemming Besenbacher, Chairman of the Board of Directors at Carlsberg A/S and the Carlsberg Foundation
- Birgitte Nauntofte, Executive Director of the Novo Nordisk Foundation
- Anne-Marie Engel, Director of Research at Lundbeck Foundation
- Henrik Tronier, Head of Programme (Humanities) at Velux Foundation
- Lars Arnskov Olsen, Senior adviser (Natural science, technology, agricultural science) at Villum Foundation
- Anders Hede, Head of Research at Tryg Foundation
- Peter Olesen, former Chair of Strategic Research Council, Chair of European Institute of Innovation and Technology (EIT).

Former Chairs of the Board of DFF

- Jens Christian Djurhuus, functioning chair 2007-2012
- Nina Smith, functioning chair 2004-2007.

DFF

- Frederik Tygstrup, Chair of DFF| Humanities, Associate Professor
- Kell Mortensen, Chair of DFF| Natural Sciences, Professor
- Hans Christian Kongsted, Chair of DFF| Social Sciences, Professor
- Niels Borregaard, Chair of DFF| Medical Sciences, Clinical Professor
- Ole Thybo Thomsen, Chair of DFF| Technology and Production Sciences, Professor
- Peter Munk Christiansen, Chair of the Board of DFF
- Merete Fredholm, Vice-chair of the Board of DFF
- Grete Kladakis, Head of the DFF secretariat.

Appendix 4: SWOT-Analysis by DFF

Strengths

- Excellence criteria and bottom up approach
- Covers all areas of research
- Promotes the conditions for independent research at national and international level
- Strengthens the growth layer in research
- Assures the development of new ideas
- Capacity to handle cross-disciplinarity
- Strong research advisory services to Government etc.

Opportunities

- Further strengthening of bottom up research and excellence
- Strengthening of long-term thinking and planning in research policy
- Promoting basic research as a prerequisite for innovation
- Dialogue with research institutions about optimizing institutional interplay in Danish research policy
- Strengthening internationalisation of Danish research
- Active participant in Danish research debate at elite as well as popular level.

Weaknesses

- Declining success rates increase probability of risk aversion
- Coherence between the five scientific councils
- Are we good enough at incorporating new research fields
- Follow-up on completed research projects.

Threats

- Lack of visibility and understanding in the political system
- Too little political support for the need for long-term investment in frontier research
- The view on Council members' applications
- Vulnerability in future financing.

Appendix 5: Bibliometric Analyses of Publications by Grantees of DFF

The Bibliometric Analyses of Publications by Grantees of DFF can be downloaded from the website of the Ministry of Higher Education and Science:

ufm.dk/dff-bibliometric-analyses

Appendix 6: Overhead Policies

DFF grants include funding of indirect expenses which are necessary to enable the research institutions to provide the framework that the researchers need for carrying out their projects. The indirect expenses – in the form of overhead – help to cover the institutions' normal joint expenses for rent, premises, administration, etc.

Overhead is calculated as a fixed percentage share of the amount that has been awarded for the direct expenses of the project. The applicable overhead rates are dependent on the institution type (see Table A6.1 below).

Table A6.1
Rate of overhead in grants from the Danish Council for Independent Research (percent)

Type of institution	Overhead rate
Public research institutions (universities and sector research institutions)	44.0 %
Semi-public research institutions	20.0 %
Public hospitals	3.1 %
State authorized museums	3.1 %
Private enterprises, foreign institutions etc.	0.0 %

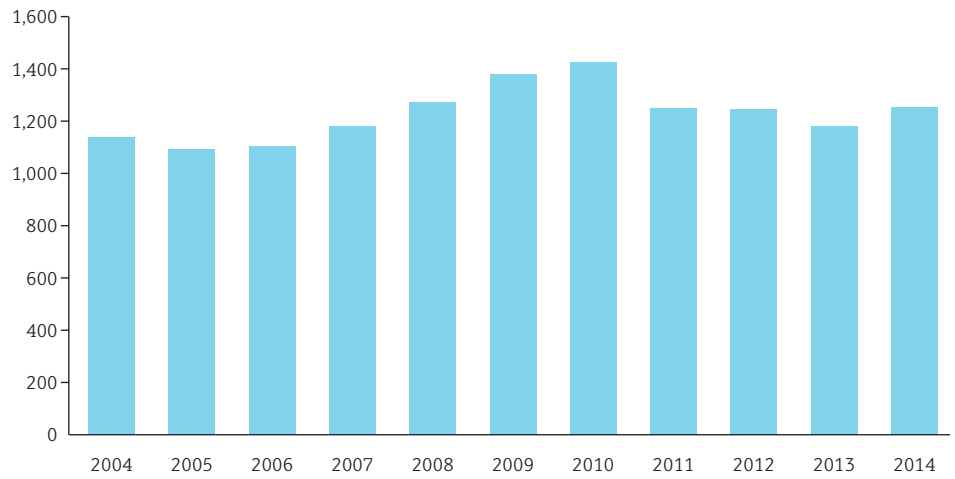
Source: The Danish Agency for Science, Technology and Innovation

In 2006, the Danish Government announced its intentions that an increased share of the public research funds should be distributed through nationwide competition, rather than through the basic grants to the universities. Another objective was that the competitive research funds should cover the total expenses incurred by the institutions in relation to the research activities. On the basis of this, the Danish Parliament carried out a funding reform in 2008-2009, which aimed to establish a clearer division of responsibilities between the research councils and research institutions. This reform entailed a sharper division between the research councils' grant distributions and the basic funding channelled to the research institutions. While DFF previously supported projects with supplementary funding from the institutions, the Council has since 2009 been required to cover the full project expenses.

The full financing of indirect expenses was secured by increasing DFF's overhead rate for public research institutions, from the previous 20 per cent to 35 per cent in 2008, and subsequently to the current rate of 44 per cent in 2009. The public research institutions include the universities, which receive and administer the majority of the grants distributed by DFF. Thus, in 2013 93 per cent of the total amount distributed by DFF went to public research institutions. Figure A6.1 illustrates the annual funds including overhead expenditures allocated to DFF between 2004 and 2014.

Figure A6.1

Annual funds allocated to the Danish Council for Independent Research under the Danish Finance Act, 2004-2014 (DKK million)



Source: The Danish Agency for Science, Technology and Innovation

