



Review of Human Frontier Science Program Final Report

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Review of Human Frontier Science Program

Final Report

Manchester Institute of Innovation Research
The University of Manchester

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1st May 2010

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Executive Summary

The **Human Frontier Science Program** (HFSP) is unique in its combination of supporting world class scientific research, innovative and increasingly multi-disciplinary, approaches and – above all – truly international teams.¹ The programme is focused on life sciences, with considerable opening to other sciences and cross-disciplinary research. It has a broader variety of programs, supporting independent research of individuals in distinct host organisations, combined with international – including inter-continental – mobility and collaboration. It seeks to develop independent careers and thus puts high emphasis on early stage researchers (approximately 70% of grantees). The Programme's inbuilt repatriating mechanism is aimed at institutional capacity building in the countries from where awardees originally come.

This executive summary synthesises the main results of an evaluation of the programmes of the HFSP which it commissioned a team from the Manchester Institute of Innovation Research and Evidence Ltd to carry out. The remit of this review was to assess the **outcome, impact** and **appropriateness** of all six schemes of the HFSP. The review focuses on the innovations that were introduced since 2000, which mainly are a stronger focus on inter-disciplinary research in all schemes, some changes to the fellowship award and a set of new funding schemes introduced since 2000. Thus, the evaluation looked at:

Long Term Fellowships to fund research and training for a post doc in a new area within life sciences in a leading lab in another country. Here the evaluation includes the extension of the fellowship to 3 years with the option for a **deferral** after the first two years and the possibility of spending the last year of the fellowship **in the home country** of the fellow in order to foster repatriation

Cross-Disciplinary Fellowships to enable scientists with a PhD outside the life sciences to engage in life science research abroad (innovation: first award year in 2005),

Career Development Awards to finance repatriation and reintegration of former HFSP fellows and foster team building and structures in the home country (innovation: first award year 2003).

Program Grants to finance teams from different countries to conduct research that could not be undertaken without this collaboration

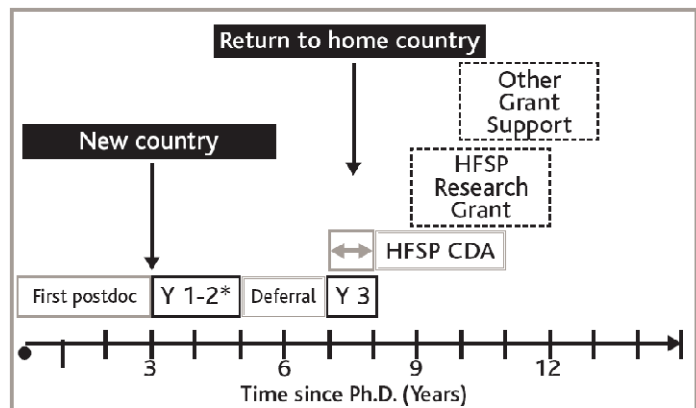
Young Investigator Grants to finance teams of early stage career scientists within the first five years after obtaining the first independent post doc position (first award year 2002: in 2005 financial conditions in line with Grant scheme).

Short Term Fellowship: enabling short term stays abroad.

The figure A below shows how the various schemes are logically linked together.

¹ This unique combination, especially the international dimensions, has been extensively reviewed by T. Wiesel in his HFSPHFSP presentation at the Conference on Drivers for International Collaboration, October 2008, Brussels.

Figure A HFSP Career and Research Support



* The option to defer the start of the third year is available to Long-Term and Cross-Disciplinary Fellows

Source: HFSP 2008, Annual report 2007, Strasbourg, p. 18

All of the HFSP schemes have distinct goals and funding conditions. The evaluation therefore took a contingency approach, as far as is possible taking into account the variety of goals and conditions for awardees and host organisations.

The review started in May 2009 and was finished in March 2010, it consists of **five elements**:

1. Surveys (with response rates between 35% and 73%, which is exceptionally high given that the questionnaires for the schemes (and their variants) have been very extensive.
 - Large scale awardees surveys customised to each programme
 - Host Organisation survey for the two fellowship programmes
2. Interviewing individual awardees
 - pilot interviews before surveys went out
 - interviews conducted covering all schemes at least twice, based on survey results
3. Comparative perspective: two most relevant comparators (EMBO & Marie Curie)
4. Integrative analysis of survey and bibliometrics data, some cross-cutting analysis
5. Bibliometric analysis

In addition, a commercialisation analysis was done which illustrated, on a case study basis, how the HFSP programmes contribute to the generation and application of research results into the marketplace.

The structure of the main report and this executive summary are organised along HFSP programme lines. The text is organised around the survey data but integrates the various methodological steps, i.e. the survey findings are complemented by the interviews data and overviews of comparator programmes. The Long Term and Cross Disciplinary Fellowships section also includes findings from host organisation survey. After the individual programmes' analyses are presented, further cross-cutting analysis is presented, focusing on the linkage of some bibliometric data with survey data and on the question of inter-disciplinarity. The results of the bibliometric analysis are summarised in this executive summary and reported in full in a separate document drafted by Evidence Ltd. The results of the commercialisation study are also summarised in the executive summary and included as an annex of the main report.

LONG TERM and CROSS DISCIPLINARY FELLOWSHIPS

The **Long Term Fellowship** aims to “provide postdoctoral training opportunities for talented young scientists in the world's best laboratories and at the same time to facilitate the mobility of

young scientists between countries".² The idea of the programme is that young researchers need as thorough as possible inter-disciplinary training in order to become truly independent researchers. Therefore, fellows are expected to seek training and to conduct research in other fields within biology in suitable host organisations abroad. The funding is for 3 years. Recognising the need to foster repatriation and foster brain-circulation within the LTF (and CDF, below), the HFSP has increased the funding duration in combination with a deferral of the third year and the opportunity to spend the last year within the home country.

Fellow survey

The analysis is based on the answers of 470 LTF (44.8% response rate) and 27 CDF (73% response rate) who have responded to the ambitious and lengthy questionnaire, thus indicating a strong commitment to the award. All in all, the programme can be rated as very successful in terms of its standing, the conditions it offers, the behavioural changes it triggers, the outcome it produces and the impact it has on the researchers and the host organisations.

The outcome and impact of the fellowship, insofar it can be evaluated through the survey (rather than the bibliometric analysis), is very positive. First, the HFSP fellowships are catalysts **for career development**. For roughly half of the fellows, the HFSP was the first major award, and almost half of the LTF and all CDF plan to apply or have already applied for a CDA. Additionally, in their self-assessment, 90% of LTF and all CDF assigned a positive or very positive impact on their careers of the fellowship (in combination with raising visibility and reputation), with roughly 25% being promoted during their fellowship.

Secondly, the fellowships show a **high level of additionality**. Without the fellowship, **one third of the LTF and almost half of the CDF would not have done their project**. Out of those who would have done the project, without HFSP funding, the fellowship nevertheless enabled many to pursue research better geared to their needs. This was most noticeably evident in access to better resources and the outreach for international and intercontinental partners. In essence, a vast majority of fellows state that they could pursue **exactly the research they wanted**. The fellowship also contributed considerably to the broadening of their scientific research. The **impacts** in the self assessment **are less widely felt** in terms of **accelerating publication** and intensifying international co-publication.

Third, the **shift of disciplines and science areas in the fellowship** – albeit challenging – **works**. A key feature of the fellowships is the change of areas or disciplines (CDF) and the interdisciplinary collaboration. As for the change of disciplines, the CDF seeks to deal with the broadly shared barriers that the scientists perceive when changing disciplines. The **benefit-cost ratio** of the **shift in disciplines** is **very positive**. Further, the incentive and opportunity to collaborate (in the host organisation *and* beyond) in the fellowships is widely used and highly rated. Especially the CDF collaborate intensively with scientists from other disciplines, thus the integration back to their older discipline is working and **the HFSP closes an important perceived funding gap** for scientists changing disciplines. The vast majority of CDF and a majority of LTF report a huge **improvement in their ability to collaborate** with other disciplines, and majority of fellows report a positive impact on their abilities to collaborate across disciplines. Further, by and large the integration in host organisations appears to work very well, in fact many respondents report **positive effects on the host organisations** in terms of opening up to new research areas and in giving young researchers more autonomy. The majority of fellows report a vastly positive reception of colleagues in terms of integrating methods and skills from other disciplines and areas (this is also reflected in the host survey, see below).

² HFSP (2008): Annual Report 2007, Strasbourg, p. 19

However, for the CDF there appears to be a **tension**, though. On the one hand the majority experiences a **broadening** of the kinds of journals they publish in (and their scientific horizon more generally), on the other hand this leads to a **gap in the individual publication records** produced; furthermore there is often insufficient time to build up a strong standing in life science during the CDF. This may explain that all CDF applied or seek to apply for a CDA, whereby the CDA then enables researchers to continue on a new trajectory.

The geographical and institutional movement of fellows shows interesting patterns. The US is – as well known – the strongest host country, which means for the majority of countries that more fellows leave than enter. However, the picture changes somewhat when one takes into consideration the post fellowship movements. While a relative majority stays in the host organisation, **35% of LTF and 44% of CDF, after having finished their fellowship, went back to their home country or plan to do so** (albeit a small minority goes back to the home institution in their countries). Thus the predominance of the US is reduced considerably through post fellowship movements.

The movement back to the home country is **supported by** the allowing the **fellow's third year to be spent at home**, an opportunity taken up by 58 LTF and 7 CDF in our sample. This is mainly driven by the desire to build up a lab or group in the home country. Interestingly, those fellows who spend the third year at home do not, with very few exceptions, come from and return to developing or emerging countries.

In comparison to other programmes on the basis of the surveys, the HFSP rates by far as best in all categories asked. Only a few fellows mention other programmes as better in selected categories, and the only programme that seems to be more often mentioned is EMBO. This is interesting, as **EMBO** is the programme which by far is the most important for the fellows prior to their HFSP award.

The fellowship **conditions** are assessed as **very appropriate**, only a minority saw the living allowance or the duration as problematic, and a large majority strongly welcomed the travel allowance as being important. The flexibility offered by the deferral is rated as important, but, strangely, is not taken up very often at all. While the communication offered is taken up and widely used, and especially the annual meetings are rated as contributing to visibility and networking (to a lesser extent), **there is no widespread strong sense of belonging to a HFSP community**. Here the HFSP could act, as **there is some readiness among awardees present and past to join an alumni organisation**.

In sum, the HFSP fills an important gap and offers what life scientists appear to demand in terms of overall conditions. These include incentives to facilitate collaboration, movement across disciplines and in some cases, the opportunity to return to their home countries. It appears to have high impact on capabilities, behaviour and careers.

The perspective of fellow host supervisors

An additional survey was performed on the hosts of the fellows in order to better understand the institutional context of fellows, their impact on the hosts and the conditions of the fellowship. The survey was conducted in January and February 2010. **254 host supervisors responded**, a response rate of 25.6%, given the marginal importance of a single scheme for hosts this is a high number. This is a very satisfying response rate. The 254 host respondents represent 356 supervised fellows, whereby a small number of respondents indicate a very high number of fellows they have supervised (in one case up to 10 fellows). The share of female respondents is 16%. Supervision is by and large not organised through the head of institutes, but through the senior researcher who is directly responsible for functional units.

There is clearly a **high impact of the fellow on the research in the host organisations**, and the contribution of the fellows to the hosts by and large supersede expectations of hosts: **62%** of all those responding to the question (178) indicated **strong impact**, 36.5% moderate impact, only a tiny fraction say no impact at all. 93 % out of 193 respondents confirmed that the fellow contributed with a new area of research. The responses indicated that the contribution of the fellow is strong both as regards research fields and methods, almost three quarters of all respondents indicated that the **fellow started a new line of research area or new activities in terms of methods**. The majority of respondents indicated that the most significant types of impact came in the introduction of new technologies and methods and improvements to existing technologies and methods.

Further, the HFSP fellow and the “newness” of the research conducted have **serious institutional impact**; they make a change for the laboratory beyond the immediate line of research that is funded. More than 90% indicated that the fellow added a great deal or somewhat to more prestige of the lab. Considerable impact is also seen for inter-disciplinary research and flexibility of research. **Interestingly, hosts rate the impact on the organisations higher than the fellows themselves**, but this is perhaps to be expected as hosts have a better understanding of the organisation in which the fellow is employed.

At the same time, the fellows appear to be highly **independent** and the supervision time needed can be assessed as being low. The data also shows that the HFSP fellows do not cause disruptions in existing team work; if at all they do change team working, the presence of new **fellows enhances team-working**.

Overall, the fellows **exceeded expectations** of hosts. In almost all dimensions asked for (introducing new technologies, contributing to solving specific problems the lab had and leading to more international and interdisciplinary collaboration) the number of respondents indicating achievement is higher than the number of respondents expecting the effect to happen. The only dimension in which expectations were slightly broader than the actual achievement was in the contribution to overall research, 99% of respondents expected positive contribution, and a highly impressive 96% of all respondents acknowledged that this actually had happened.

Effects also appear to be **persistent**. There is a knowledge and technique build up and transfer as a result of the fellowship scheme, as a vast majority of respondents (84%) confirmed that after the departure of the supervised fellow any new technologies introduced became a standard feature in their labs. Moreover, **after the fellowship had ended**, only 17.5% of respondents ended the collaboration with the fellow, while **30% employed the fellow**, and the rest continued collaboration in one form or the other.

As regards the **conditions the fellowship offered**, there is **some need for hosts to co-fund** the fellowship, as 5% of hosts reported to add to the fellowship money. The main issue here is the **contribution to health insurance costs**, which are variable across regions. In addition, for many fellows the host provides some funds for research conditions more generally (equipment etc.). The need to employ a fellow because of institutional regulation is not a broad issue. Finally, the selection and mobilisation function of the HFSPO fellowship work, as less than 18% indicate that they would have been able to hire a fellow of the same quality.

CAREER DEVELOPMENT AWARD

The Career Development Award has been introduced in 2003 in order to facilitate the transition from post doc to independent scientist. It supports former LTF and CDF awardees in building up a lab in their home country, thereby intensifying their international collaborations and

experimental endeavours on emerging subjects in the life sciences through drawing on their experience of neighbouring disciplines during their HFSP fellowship.

90 responses were made to the questionnaire from a total population of award holders of 141, giving coverage of the whole population of awardees of 64%.

The data from the survey confirms that **academic and research careers are the sole preserve and intention of the CDA awardees.** The **CDA host research institution is most likely to be the home of the awardee on completion of the award;** otherwise the home research institution is the alternative. However, it is five times as likely that the awardee will remain with the CDA award organisation (host) than to go to the original home research institution.

In relation to **additionality, the high number of negative responses to the question of whether the research would have been done without the CDA suggests that the funding is critical in a large number of instances,** and that without **HFSP awards, vital scientific activity would not place.**

The most significant contribution made by the CDA to the work carried out by the awardee in terms of the additionality of the award is financial. Other important aspects of additionality are that the work would have taken longer had it not been for the CDA award. Respondents report that the **smallest contribution in terms of additionality of the CDA is to interdisciplinarity:** here there is a belief that interdisciplinarity is not greatly assisted by the CDA, compared with other factors.

Concerning the **conditions under which awardees worked in their host organisations,** awardees reported that they were **very satisfactorily integrated into their teams, with very high levels of integration. Collaboration within the host institution was also significant in its extent.** Thus, while a small number did not collaborate (either not at all or only a little) and some only collaborated partly, **61 out of the sample of 88 were able to collaborate significantly or very significantly (69%).**

Awardees reported that host team composition was very good and appropriate for research. This may be related to the high levels of control which awardees have for the financial management and control of appointments of staff within teams created through the CDA. For many (77 from 83), the CDA was the first opportunity to experience the leadership of a team.

THE PROGRAM GRANT AND YOUNG INVESTIGATOR GRANT

Research Grants are awarded for collaborative projects of fundamental research carried out by a team of two to four scientists from different countries. Research teams must be international and preferably intercontinental, and there is some emphasis on the inter-disciplinary nature of the collaboration. The award period is three years. Priority is given to novel collaborations that bring together scientists from different disciplines (e.g. biology, chemistry, physics, mathematics, computer science and engineering). The Principal Applicant's laboratory must be located in one of the member countries while the other team members may be situated anywhere in the world."³

The analysis of this scheme is based on 134 PG grantees and 48 YIG grantees, which is a response rate of 36% and 53%. The **additionality** of the grants in terms of enabling project that otherwise would not have been possible is very strong, **75% of all respondents could only do**

³ HFSP (2008): Annual Report 2007, Strasbourg, p. 30

their project because of their grant, and those who would have done it would have done it considerably differently and in essence less appropriately.

The major reason for this high attribution of additionality is the **international and inter-continental collaboration** the program demands and offers. Both schemes do what they are supposed to do: they **trigger broader collaboration in various dimensions**. The **interdisciplinary collaborations** have grown from none in 1999 to **80%** of all respondents in **2009**, now matching the level of collaboration across areas within Life Science (which has been at the level of 80% high throughout the 10 years covered). **Three quarters** of grant holders report – for all three dimensions of collaborations (inter-disciplinary, inter-area within science and international) – **more or much more benefits than costs**. Especially the inter-continental opportunity appears to be crucial. While a vast majority of grantees has prior collaboration experience, the projects nevertheless trigger **new combinations**. The collaboration is in most cases deepened through mutual visits and exchange of personnel, and the overwhelming majority of respondents felt fully integrated in the project. In terms of longer term impact, the vast majority of grant holders report that their **options for future international and intercontinental collaboration have considerably or hugely improved** (persistence).

The grantees report similar positive impacts than the fellow in terms of **overall career development**, and the share of grantees to be promoted during the grant is higher than with the fellows. The impact in terms of accelerating publications in peer reviewed journals is somewhat higher than in the fellowship programmes – given that grantees are in general more senior this seems reasonable. A clear majority of grantees also report a **broadening of their research fields**. This also extends to the host organisations, as three quarters of grantees are capable of doing research in their host organisations that they would not have been able to do in this organisation without the grant, and as such the impact is not only on the grantee, but also on the host organisation that expands linkages and benefits from new combinations.

A comparison to other programmes is less straightforward, as only few respondents actually were able to name a **comparator programme** that would be appropriate. The actual comparison on the basis of rather few cases of programmes mentioned **makes the grant programme appear as better or much better in all categories**. On the basis of 40 respondents who were able to answer the question on the basis of a comparator program they could think of and wanted to compare, only the duration could be an issue, here 13 respondents rated the HFSP worse than the comparator, for other categories the share of those rating worse is between 2 and 6 (out of the 40).

In terms of being informed about HFSP activities, there is an interesting difference between the YIG community and the PG holders, the latter rely more on the newsletter, while the former more actively go for the web-site. Again, also with the grantees there appears to be a **mismatch** between the **relatively high readiness to join an alumni organisation** (especially with the YIG) and the **relatively modest share of grantees who actually strongly feel to be part of a HFSP community**. The annual meetings appear to be instrumental here, beyond the visibility effects especially the YIG in particular use those to build up and maintain networks. The financial flexibility of the grant schemes is highly welcome and used by roughly half of the respondents.

THE SHORT TERM FELLOWSHIP

The short term fellowship allows scientists to visit research organisations in another country for a period between 2 weeks and 3 months. It is not limited to certain types of applicants, however, applicants need to have a doctorate and some preference is given to young researchers. In addition, former LTF or CDF fellows can use the scheme to follow up on

research they did in their fellowship host organisation. All in all, the scheme is meant to “support the creation and expansion of professional networks. This short term support enables young investigators to expand their professional network abroad by supporting research training.”⁴

The survey received **153 responses**, and thus a rate of coverage of 55%. Slightly less than 50% of all respondent stayed for the full duration of the STF, 12 weeks; the rest of the ST Fellows showed quite a variety of durations. Only 6 respondents answered that they had held a HFSPO fellowship before. Slightly more, 9%, applied for the STF while they had an HFSPO grant. Academics **from 35 countries** are represented, with French and US Americans leading the table (16). There are some obvious patterns of attractiveness of countries (with some countries having more incoming than out-going STF awardees, with the US being by far the most attractive country. However, the STF is no catalyst for more permanent mobility; it does not lead to a high number of follow on change of employee (12% of fellows now work for their former STF host).

For 83% the HFSP STF was **their only short term mobility grant** in their academic careers – and there was not one obvious other programme that came up as dominant source for short term mobility funding in our sample (although EMBO, obviously, has a broad short term fellowship activity in general, the share of HFSP short term fellows also having had an EMBO short term fellowship grant is very low - 4). However, judged by the prior experience of short term stays, the survey finds that **mobility even prior to the STF** has been **possible** even without specific mobility grants.

The outstanding features of the HFSP short term fellowship is that it is **highly prestigious** (two thirds of respondents indicate this as a reason) and that it is **perceived** as the only short term fellowship that allows **inter-continental visits**. For former fellows the STF is also an obvious means to finish off or follow on from their work during the fellowship.

Asked for concrete expectations of their STF, the most important point that emerged concerned **learning and developing techniques** and using techniques with expertise support (third most important). Those expectations were largely fulfilled. The second most important expectation is to prepare future international collaboration; however, one third of the respondents did not feel that they had been successful in turning the STF into collaboration. The various effects of a STF do not differ between those who stay the full duration and those who stay for shorter periods.

Comparing the HFSP STF to other programmes, slightly more than one third confirmed that other schemes would have served the same purpose, and for **more than half of the respondents STF was a unique opportunity**. Only one single respondent said that the alternative scheme would have been better than HFSP, half of the sample said other schemes would have been equally good, the other half claiming that HFSP would be better than comparator schemes.

Roughly two thirds of respondents indicate a **significant or very significant improvement** as for the **future options to collaborate** because of the STF. 80% of the 153 respondents also claimed that the host benefited, most often in the form of future collaborations between organisations.

As for conditions provided, the ST-Fellows are **on average content** with the amount of the allowance, a few more than 70% think it is adequate, and slightly more (18%) think that it is

⁴ HFSPO 2009, Annual report 2008, Strasbourg, p. 14

generous compared to those that think it is too low (10%), and the vast majority likes the flexibility of the scheme.

BIBLIOMETRIC STUDY – nutshell

A comprehensive bibliometrics study has been performed and is delivered in a separate document; the five major results are as follows

- HFSP-supported research publications have an extremely good citation impact compared to world baselines.
- Throughout the 10-year period covered by this report the average impact of HFSP-supported research has consistently been well above the world average.
- Impact Profiles® confirm these baseline bibliometric indicators and show strong skew – compared to reference data - towards the high impact categories consistent with performance achieved by world-class institutions.
- All HFSP programmes support high-quality research,
- Long-term Fellowships produce the most exceptional outputs.
- CDA: less broad in excellence

SOME CROSS CUTTING IN-DEPTH ANALYSIS

A central concern for research funders and research performers in the area of interdisciplinary research is that the citation impact of interdisciplinary work is often less than work presented within a single discipline. Such differences create the perception that interdisciplinary research is less valuable and of lower quality. Investigation of this issue by the Study Team indicates that while the overall (global) quality of HFSP research whether mono or multidisciplinary is very high (see Evidence's Report), internal comparisons entirely within the data set of HFSP publications reveal a trend towards interdisciplinary research having lower average rebased citation counts. Thus amongst papers that are more multi-disciplinary, there are slightly fewer in the higher quartiles, to the extent that the differences are statistically significant. The award where more interdisciplinarity is found, for example the CDA, is one where there are more multidisciplinary papers. In comparisons between the two major schemes, the LTF and the RGP (labelled PG in the survey analysis above), the LTF has a higher annual average rebased impact across all its papers than the RGP, reflecting a constantly higher average number of categories (indicating multi-disciplinarity) per paper.

Some illustration on commercialisation of HFSP funded research

During the course of this main study, a small scale review was undertaken to examine the commercialisation stemming from HFSP awards. This study reviewed a sample of individuals who had previously been identified in two earlier pieces of work, an HFSP poll of researchers – former awardees – which was carried out in 2008, and by an in-depth study by Mitsubishi that took place also in 2008. These two pieces of work identified commercialisation activities arising from HFSP awards, although the Mitsubishi study was extensive and detailed and examined scientific impacts of the research as well. The aim of the small scale review undertaken in 2010 as part of this evaluation of the HFSP was to detect the role and influence of the HFSP upon commercialisation activities arising from, in whatever way, its funding activities. The review identified that the work of a number of academic researchers who had received grants (either Research Grants or Long Term Fellowships) had resulted inter alia ultimately in patent applications, awards of patents, and company formation, predominantly in the area of tools and methodologies relevant to drug design or the preparation of biological material. HFSP funding

was found to have been decisive in most of these cases in allowing the awardee the opportunity to develop the scientific knowledge on which the commercial activities were subsequently based. HFSP research clearly supports the development of ground breaking scientific knowledge, but such funding also supports the development of key technologies and innovation.

SYNTHESIS AND RECOMMENDATIONS

The HFSP provides a unique set of programmes, with a sui generis combination of excellence, high risk, inter- and cross-disciplinarity and a systematic global outreach. The programmes are designed to complement each other, to support individuals, teams and – indirectly – organisations. At the same time the HFSP is well aware of the structural effects of the programmes in terms of mobility and build up of excellence in national research systems. It thus also strives for a balanced mobility pattern of the awardees without in any way compromising excellence. All in all, the scientific excellence as measured through bibliometric analysis and the impacts on careers and organisations as analysed in the surveys are highly impressive, and the prestige of the programme appears unique.

In sum, the HFSP programmes contribute to research and capacity building in life sciences in a crucial way. In their unique combination they constitute an opportunity structure for research in life science, whereby risk-taking, mobility, collaboration is enabled that follows the need of that field and the desires of individuals. It thus complements national and other supranational schemes that, one way or the other, are more limited than the offering of the HFSP. Despite a set of potential improvements and despite the continuous challenges of inter- and cross-disciplinary research and collaboration for individuals and institutes, the HFSP schemes are a functional cornerstone of the global research funding landscape that attracts and breeds excellence at the highest level – and at the same time allows for an in-built application relevance of research.

The programme and the organisation are extremely well regarded in the funded community which was at the centre of this evaluation. By and large, all programmes do what they intend to do. In addition, although the management of the programme was not in the focus of the evaluation, all indications we have about the management point towards excellence and a very high level of user-friendliness. The feedback in open text fields and in interviews about the HFSP is overwhelmingly positive.

The profiles, impacts and strengths of the individual programmes have just been summarised and do not need repetition. The programmatic innovations, such as the CDF and (earlier) the CDA and YIG, are challenging, but work. The broadening of programmes has accentuated the profile of the HFSP even further, rather than softened it. In all schemes the overriding principles of the HFSP are present, and the effects on excellence, international collaboration and high risk research apparent. The CDF allows even more radical change and linkage of fields and disciplines and appears to achieve this even beyond the funded period. The CDA scheme has been widely accepted and become a cornerstone and catalyst in “HFSP careers”. It appears that in some cases it is a challenge to find appropriate organisational hosts and institutional framework conditions for all potential CDA awardees to go to their home country as defined in the scheme and build up careers in their niches. The Young Investigator Grant is a success, especially as regards the opportunity for an accelerated build up of international visibility and collaboration on highest levels. It is not intended to be comparable to the ERC starting grants which open up a new dimension of grant in terms of funding.

Against this background of overall excellence, additionality and effectiveness, some recommendations emerge out of the data analysis and the interviews of awardees and the analysis of a set of other organisations:

- 1) The HFSP programmes should remain risk taking and truly global, and thus continue to strengthen their unique profile. After two decades of operation, the consequent international approach and the opportunity to link knowledge areas in novel ways is still avant-garde, as all funding programmes globally search for ways to “globalise” somehow and to open up to inter-disciplinarity.
- 2) The programmes should thus continue to provide the conditions under which high risk and inter-disciplinarity can flourish.
- 3) In general, this includes that there should be no trading of numbers for duration in the fellowship scheme, the three years offered for complex and risk taking research appears appropriate. However, the development of the CDF programme should be further monitored. More than LTF fellows who change areas within life science, CDF fellows have the inherent problem of gaps in producing publications and finding networks within new areas. From the interviews and the survey it appears that for the CDF even the generous three years duration is challenging given the high transaction cost of the transition. In most cases, it appears, the fellows find funding one way or the other, often they are employed by the host to finalise a research project. However, for exceptional cases, flexible solutions for extensions might be contemplated, maybe as co-funding with the host organisation or fellow in a fourth, transitional year that would have to be well argued by the fellow and the host organisation.
- 4) Further, especially the transition process in CDF and CDA could be supported by voluntary mentoring schemes, whereby a network of volunteers / alumni are ready to support young researchers who take risk and struggle to find their position in their new areas.
- 5) The CDA scheme shows some challenges: it produces slightly lower quality in terms of publications (whereby the standing of the awardee, on the other hand, is increased through building up a team and visibility). The duration of the CDA is an issue, as it takes an enormous time to build up a team and the necessary stability for it to work properly. Further, it seems to take some CDA awardees considerable time to convince host organisations that the award is an individual one and the team-building and leadership is with the awardee. This challenge is different in different countries. The recommendation is to further accentuate vis-à-vis the host organisation the intended “ownership” of the CDA and to provide mentoring support and guidance in situations in which the national or institutional regulation make it difficult for awardees to decide autonomously on personnel matters. Further, more case-by-case flexibility as for the duration of the CDA may be envisaged.
- 6) Both the fellowships and the CDA have a structural element, the repatriation to home countries. The CDA requires awardees to go back to the home country rather than staying in the host country or returning to the PHD country (as EMBO does). As such it is an explicit structure building tool. However, in the case of the LTF the data shows that fellows from emerging countries do not take it up in a meaningful way. Equally, indications from interviews with CDAs show that due to the home country principle as defined in the HFSP, there is an in-built disadvantage for awardees stemming from countries with weaker infrastructures. As the goal is both individual and institutional (structure in home countries), for the CDA this may occasionally lead to tough decisions and to the search for a second best option in order to fulfil the criteria. This is an in-built

tension for which no easy solution can be found as long as the structural effect is at stake. To recommend on the policy and political trade-off between abandoning the home country rule and opening it up is beyond this report, but it is important to point towards the problem.

- 7) Across all schemes there appears to be a readiness for community building and further networking within the HFSP. While the HFSP secretariat should not act as pro-active team-builder (for many reasons), it could even intensify networking activities around the HFSP. The annual conference has been praised for providing the necessary platforms, but more fora and opportunities might be useful, especially as the HFSP community shares the experience of high-risk, trans-disciplinary research. All this should also include alumni, even if the focus will be with current awardees.
- 8) Related to this, as mentioned above already, the HFSP could discuss the idea of having voluntary mentors especially for cases of serious change of research focus or discipline. Those mentors could support the integration into networks beyond the actual host supervisors (who often themselves are not fully linked to the relevant but network) and give advice as to how best translate the learning into publications.

1 Introduction

The **Human Frontier Science Program** (HFSP) is unique in its combination of supporting world class scientific research, innovative and increasingly multi-disciplinary, approaches and – above all – truly international teams.⁵ The programme is focused on life sciences, with considerable opening to other sciences and cross-disciplinary research. It has a broader variety of programs, supporting independent research of individuals in distinct host organisations, combined with international – including inter-continental – mobility and collaboration. It seeks to develop independent careers and thus puts high emphasis on early stage researchers (approximately 70% of grantees). The Programme's inbuilt repatriating mechanism is aimed at institutional capacity building in the countries from where awardees originally come.

The HFSP Organisation has commissioned a review of the HFSP programmes to a team of the Manchester Institute of Innovation Research and Evidence Ltd. The remit of this review is to assess the **outcome, impact** and **appropriateness** of the various schemes. We understand outcome to be the quantity and nature of the *scientific results* achieved in the work funded by HFSP, and the *collaboration* and *mobility patterns* are similarly enabled. As impact, we define changes for the development, achievements and careers of the awardees that can be *attributed* to the programme. This involves intended impact (e.g. as outlined in the programme goals or the stated applicants intentions, career development, scientific relevance and quality etc.) and unintended impact; direct impact (as an immediate result of work funded) and indirect impact (such as community building that is sustainable beyond the period of funding) and assessment of the net impact that will result out of both positive and negative impacts and the classical attribution problem. To evaluate appropriateness means to assess if the means designed support the goals of the individual programs and grantees.

The review covers all six schemes of the HFSP and focuses on the innovations that were introduced since 2000. These are mainly a stronger focus on inter-disciplinary research in all schemes, some changes to the fellowship award and a set of innovative funding schemes introduced since 2000:

Long Term Fellowships to fund research and training for a post doc in a new area within life sciences in a leading lab in another country. Here the evaluation includes the extension of the fellowship to 3 years with the option for a **deferral** after the first two years and the possibility of spending the last year of the fellowship **in the home country** of the fellow in order to foster repatriation

Cross-Disciplinary Fellowships to enable scientists with a PhD outside the life sciences to engage in life science research abroad (innovation: first award year in 2005),

Career Development Awards to finance repatriation and reintegration of former HFSP fellows and foster team building and structures in the home country (innovation: first award year 2003).

Program Grants to finance teams from different countries to conduct research that could not be undertaken without this collaboration

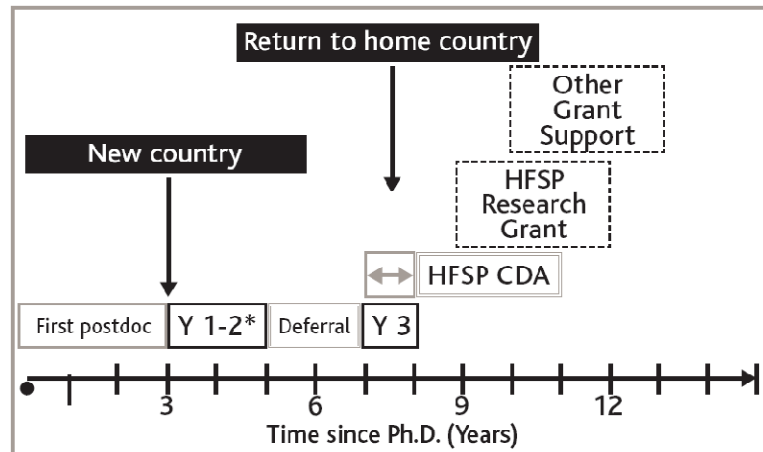
⁵ This unique combination, especially the international dimensions, has been magnificently demonstrated by T. Wiesel in his HFSP presentation at the Conference on Drivers for International Collaboration, October 2008, Brussels.

Young Investigator Grants to finance teams of early stage career scientists within the first five years after obtaining the first independent post doc position (first award year 2002: in 2005 financial conditions in line with Grant scheme).

Short Term Fellowship: enabling short term stays abroad.

The figure (Fig.1) below shows how the various schemes are linked together.

Figure 1: HFSP Career and Research Support



* The option to defer the start of the third year is available to Long-Term and Cross-Disciplinary Fellows

Source: HFSPPO 2008 p. 18

All of the HFSP schemes have distinct goals and funding conditions. Our evaluation, therefore, takes a contingency approach, so that as far as is possible taking into account the variety of goals and conditions for awardees and host organisations.

The review started in May 2009 and was finished in March 2010. This review consists of **five elements**:

6. Surveys
 - Large scale awardees surveys customised to each programme
 - Host Organisation survey
7. Interviewing individual awardees
 - 7 pilot interviews were undertaken before surveys went out
 - 7 interviews conducted covering all schemes at least twice, on based of survey results
8. Comparative perspective : two most relevant comparators (EMBO & Marie Curie)
9. Integrative analysis of survey and bibliometrics data
10. Bibliometric analysis

The report is structured as follows: After a short methodological section (section 2), the report is structured along the four major programme lines LTF/CDF, CDA and Grants/YIG and Short Term Fellowship. The LTF/CDF section contains, in addition, the analysis of the survey on fellow host supervisors. All parts contain the analysis of the surveys and are enriched through interview analysis with awardees and representatives of or experts on comparator programmes. After that, we present two further analyses. An overall summary is provided in the executive summary at the beginning of this document.

2 Review of Schemes

2.1 Methodology and Data Basis

The basic approach of the evaluation and the leading questions to be answered were discussed in a kick off meeting at the HFSPo secretariat on June 15. This led to a set of modifications and clarification of methodological issues. From May to October 2009 the bibliometric analysis was conducted (Karen Gurney, Evidence). From May to early July the questionnaires for the awardee surveys were designed and tested. All programmes of the HFSPo have distinct features. They differ in goals, they target people in different stages of their careers and they have different modalities. The introductions of the Cross-Disciplinary Fellowship and the Young Investigator Award as well as some changes in the modalities of the Long Term Fellowship (deferral) have further differentiated the picture. For that reason, and in contrast to the earlier evaluation of Nifu-Step⁶, **customised surveys were designed for the four major programmes: Long Term Fellowship, Grants, Career Development Award and Short Term Fellowship**. Furthermore, the LTF questionnaires allows for a differentiation **for the Cross-Disciplinary Fellowship**, and the Grant questionnaire for differentiation for the **Young Investigator Awards**. In addition, and on request from the HFSPo Secretariat, a survey for fellowship hosts was designed and conducted.

During the summer (June to September 2009) each awardee questionnaire was designed by the review team and then intensively discussed with the HFSPo secretariat. These discussions have been exceptionally helpful. After a draft version was agreed, all questionnaires were piloted through interviews or email exchanges with awardees. The answers to these pilots were largely very positive. A few interviewees felt that the questionnaire was very ambitious but they could not think of where to cut, finding all questions relevant. Some minor modifications were done after the pilot.

The emails for all awardees were **sent out**, with an accompanying letter of support from the HFSPo, **October 16**. A first thank you and reminder letter was sent October 26, a second reminder and thank you on November 3. The **closing date** was **November 9 2009**. The data basis for the questionnaires were **all awardees** of all programmes since 1998⁷. The HFSPo secretariat delivered basic data (name, award, year of award, nationality, host organisation, country of host organisation, contact details, email address). The fellowship **host survey** was design in November to December 2009, and conducted during January and February 2010.

Responses to the surveys was **very good (see Table 1)**, especially given the extensiveness of questionnaires trying to cover all programme aspects in a broad and differentiated manner. This is an excellent basis for the analysis, and it may be explained by the gratefulness of the awardees and their commitment to support its further development. Table 1 below shows the response rate for the four schemes.

⁶ Langfeld, Liv (2006): Review of the Human Frontier Science Program's Initiatives 2000-2005.

⁷ After cost-benefit consideration between the team and the HFSPo it was decided not to target unsuccessful applicants, this would have overwhelmed the scope of the evaluation, especially given the expected low response rate.

Table 1: Responses across the schemes

		HFSP (total)	Sample	% RESPONSE
LTF	all	1048	470	44.8
	female	749	151	20.2
CDF	all	37	27	73.0
	female	8	4	50.0
CDA	all	141	90	63,8
	female		14	
PROGRAMME GRANT	all	373	134	35,9
	female	223	25	11.2
YOUNG INVESTIGATOR	all	90	48	53,3
	female	53	11	20.8
SHORT TERM	all	297	153	51,5
	Female		67	

For the host survey, we received 254 responses, a **response rate of 25.6% based on the HFSP database**. Of the 219 respondents who answered the **gender** question, 184 were male and 35 female (16%),

In addition to the surveys, which are the major pillars of this review, we conducted a set of case study interviews with awardees, both before the surveys were designed (exploratory, pilot testing) and after they were completed in order to follow up issues of special interest as they emerged from the survey. Altogether, six pilot interviews and 9 follow up in-depth case interviews were conducted. As the HFSP awardees often have a history of HFSP awards, the ex post interviews covered LTF (4 times), CDF (1), CDA (2) and Young Investigator Grant (2). In addition, on the basis of the survey responses three comparator programmes were looked at in detail, including one 2 hour face to face interview (EMBO). **The interview results are integrated throughout the following analysis on the various awards.** For the case interviews, see annex 1 which gives an additional short summary of the case.

2.2 Introduction to the structure of the results sections and the awardee questionnaire

The results in this section are presented separately for each award. At this stage, we follow the basic structure of the questionnaire. This makes sure that we cover all important aspects that were raised both in the Tender Text for the review and in the Proposal. The structure of the questionnaires is, with some variation, in principle as follows, whereby within the various sections the questions differ considerably:

- Personal Information
- Award History
- Post Award History
- Research under the award
- Collaboration
- Change of research fields/disciplines
- Changes in the host institutions / impact on lab
- Deferral (LTF/CDF only)
- Output / Benefits
- Quality of the award
- Comparable Programmes
- Funding flexibility (Grants)

For the fellow host questionnaire, the structure is slightly different and is outlined in the host survey section below.

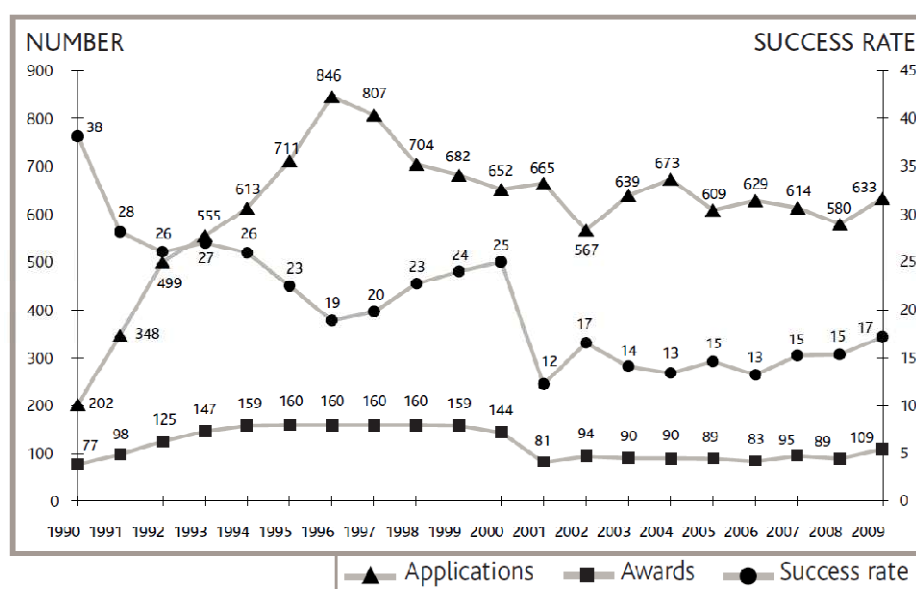
3 Results

3.1 Long Term Fellowships / Cross Disciplinary Fellowships

3.1.1 Some basic data of the sample

The **Long Term Fellowship** aims to “provide postdoctoral training opportunities for talented young scientists in the world's best laboratories and at the same time to facilitate the mobility of young scientists between countries” (HFSP0 2008, p. 19). The idea of the programme is that young researchers need a thorough, if possible inter-disciplinary training in order to become truly independent researchers. Therefore, fellows are expected to seek training and conduct research in other fields within biology in suitable host organisations abroad. The funding is for 3 years. Recognising the need to foster repatriation and foster brain-circulation within the LTF (and CDF, below), the HFSP0 has increased the funding duration in combination with a deferral of the third year and the opportunity to spend the last year within the home country. Figure 2 shows the HFSP0 data for the LTF and the CDF.

Figure 2: number of applications and awards in the LTF 1990 - 2009



Source: HFSP0 (2009): Annual Report FY 2008, p. 15

In 2005, the HFSP0 introduced the **Cross Disciplinary Fellowship** intended, “(for) postdoctoral fellows with a Ph.D. degree in the physical sciences, chemistry, mathematics, engineering, computer sciences etc. who wish to receive training in the life sciences” (HFSP0 2008, p. 19). The programme unique in outreach to other disciplines has experienced a broad acceptance by scientists outside life sciences; 10% of all fellowship applications are for the CDF. Since its inception, the CDF scheme has had 269 applications and 49 awards (average success rate of 18%): the application number over the years has been rather stable until 2008, ranging from 54 in 2007 to 65 in 2005. In 2009 there was a slight drop to 39 applications (although that number might still be subject to change: see Table 2)

⁸ Source: HFSP0 (2009): Annual Report FY 2008, p. 16

Table 2: Applications and Awards in the CDF 2005 to 2009

Cross-Disciplinary Fellowships

Award year	Number of		Success rate (%)	Female awardees	
	applications	awards		Number	(%)
2005	65	12	18	1	8
2006	55	10	18	2	20
2007	54	5	9	0	0
2008	56	11	20	1	9
2009	39	11	28	3	27
TOTAL	269	49	18	7	14

The total number of CDF respondents is 27, 4 of whom were female (this out of 39 CDF awarded until 2008). For the LTF response rates are slightly lower, and the share of female researchers in our sample is, in correspondents to the overall share of female researchers, considerably higher (see Table 1 above). The sample also represents the various award years nicely, both for the CDF and the LTF) see table below).

Table 3: Distribution of Fellowship Award Year in the Sample – LTF / CDF

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
LTF	70	30	30	27	23	34	41	49	74	54	26	458
CDF							5	8	5	6	3	27

3.1.2 Country Movements and Award History

The questionnaire traced the pre-award and the post-award of the award in order to understand patterns of movement and motivation. First of all, although the fellowship is designed to support mobility, roughly **one third of awardees** in both scheme report that they already have been **already employed** by their host organisation when they received the award. In other words, for two thirds the award was the main trigger for mobility, while one third had been mobile even without the award.

Second, in terms of geographical effects, as to be expected, a set of countries are regarded as more suitable and attractive than others, most notably the US and, to a lesser degree, the UK. The strong attraction of US means that for most of the other countries the number of applicants for the country is considerably higher than the number of foreign applicants coming into the country. This is especially true for the LTF, for some large and scientifically strong countries, such as Japan, Germany or France, and for Israel (see Table 4). For the CDF, there are only five host countries in our sample (USA 18, UK and Germany 4 each, France 1), while the CDF fellows came from 12 different countries: USA 7, Israel 6, Australia, Germany, France 2 each, and a set of countries with one each.

Table 4: Distribution Of Country Of Origin And Home Country – LTF (all respondents)*

	Pre-LTF country		Country of host		Diff. Frequencies
	Frequency	Percent	Frequency	Percent	
USA	98	21,1	287	61,1	189
UK	30	6,5	52	11,1	22
Norway	0	,0	2	,4	2
Switzerland	27	5,8	29	6,2	2
Denmark	1	,2	2	,4	1
Sweden	7	1,5	8	1,7	1
Estonia	1	,2			-1
Ireland	1	,2			-1
Poland	1	,2			-1
Belgium	3	,6	2	,4	-1
Argentina	2	,4			-2
Brazil	2	,4			-2
Russia	2	,4			-2
India	3	,6			-3
Australia	10	2,2	7	1,5	-3
Greece	4	,9			-4
Italy	7	1,5	3	,6	-4
China	5	1,1			-5
Finland	6	1,3			-6
Netherlands	13	2,8	7	1,5	-6
Canada	18	3,9	10	2,1	-8
Spain	13	2,8	3	,6	-10
Austria	13	2,8	1	,2	-12
Israel	25	5,4	1	,2	-24
France	54	11,6	20	4,3	-34
Germany	70	15,1	30	6,4	-40
Japan	48	10,3	2	,4	-46
Total	464	100	464	100	

Note: sorted for frequency pre-LTF country

The picture of award history and destination can be further differentiated looking at the current employment and thus at the development after the award has finished. For all those LTF, for which the award has finished, Table 5 shows the distribution of country of origin (pre-LTF), host country of the fellowship and country of current employment. This tells a more moderate story as to the persistent attractiveness of the US, as 196 fellows came to the USA to work as fellow, while 96 stayed, which is less than 50%. Still, in sum, the US gained 44 scientists, France gained 6 (although not extremely attractive as host) and UK gained 11. Countries who have experienced some drain are Germany, Israel (14 out of 16) and Japan.

Table 5: Distribution Pre-LTF Countries, Host Countries and Countries of Current Employment LTF (only those whose award has finished)

	Pre LTF-Country (A)	Host Country (B)	Currently employed (C)	Changes after award finished (C-B)	Net change pre-LTF to post LTF (C-A)
USA	52	196	96	-100	44
Germany	47	25	20	-5	-27
France	41	11	47	36	6
Japan	34		20	20	-14
Switzerland	21	23	26	3	5
UK	21	30	32	2	11
Israel	16		2	2	-14
Spain	12	2	11	9	-1
Canada	11	2	11	9	0
Austria	10	1	5	4	-5
Netherlands	10	5	6	1	-4
Italy	7	3	3	0	-4
Australia	5	1	8	7	3
Sweden	5	4	5	1	0
Greece	4		1	1	-3
Argentina	2	4	1	-3	-1
China	2		1	1	-1
Finland	2		1	1	-1
India	2		2	2	0
Portugal	2		1	1	-1
Belgium	1	1	3	2	2
Brazil	1		1	1	0
Denmark	1	2	2	0	1
Czech Republic			1	1	1
Norway		2	1	-1	1
Poland			1	1	1
Singapore			2	2	2
South Africa			1	1	1

*sorted for host country frequency

Pre LTF/CDF awards

The schemes are designed for early stage researchers, to build up competencies that lead to independent careers. In terms of the award history, the survey shows that many of the awardees have already had some major award before they received the HFSP. For half of the respondents the LTF was indeed the first major individual award, while 214 fellows, 48,5% of all respondents, indicate that they already had a major award (at least 6 month) before the award. For the CDF, the share of former award holders is lower (20%), which **might indicate the lack of funding sources for academics who attempt to switch disciplines**. When asked to indicate from which organisation these awards had been received, the answers for the CDF are extremely varied, there is no clear comparator or complementary programme. The picture is differentiated even more for the LTF, however, here, the **EMBO** with is by far the single most important scheme, having funded 95 out of 248 LTF awardees that had a pre-HFSP award.

We asked respondents also, where the organisations were located from which they had their first, pre HFSP award. For the LTF, Germany is by far the most important country, as 43% of all the 214 pre LTF awardees were funded by German organisations, followed by organisations in France (43%), Japan (10%) The success of attracting HFSP fellows as a host country does obviously not correlate with the existence of corresponding national funding schemes, as the UK and the US, as most important hosts, do not feature prominently as funding countries before the LTF, in contrast to Germany or Japan, where the funding infrastructure is better.

Post Fellowship developments and plans

More generally, awardees of the HFSP appear to be extremely dedicated to their profession, less than 3% of them indicated that after the award they left or plan to leave research altogether. The fellowship itself, once started, appears to be attractive enough to be finalised. Only 63 out of the 311 LTF who answered the question if they had terminated prematurely did so. 45 of which because they obtained a permanent tenure track position and **only 5** because they obtained a **more attractive fellowship**.

The fellowships are designed to lead into further HFSP schemes to build up careers. **47% of LTF fellows have applied or will apply for a CDA, and all CDF fellows indicate to do so.** Apparently, the **CDA is seen as very attractive**, especially as it allows the continuation a track of research that is inter- or cross disciplinary. Those who will not or did not apply for a CDA mainly state that they have no need for it (apparently having good positions), while quite a number did not think it to be appropriate or coming at the right time (Table 6).

Table 6: Reasons not to apply / have applied for a CDA

I will/did not have the need for it	218
I need(ed) funding, but HFSP CDA scheme was not appropriate	68
It is/was not the right point in time in my career to apply for a CDA	73
Other	89

Respondents were also asked to indicate where they were or plan to become employed after their fellowship. A **majority** stays or plans to stay at the host organisation, followed by other research organisation in country of home organisations (which seems to be slightly more important than the home institution, meaning that returning back more often than not means not going to the original home organisations). Fellows either stay in the host or in the home country; the **move to third countries appears to be the exception** (only 55 out of 522 answers indicated any affiliation, first or second, in third country). The changes into industry are almost negligible, a HFSP fellowship appears to underpin scientific academic career.

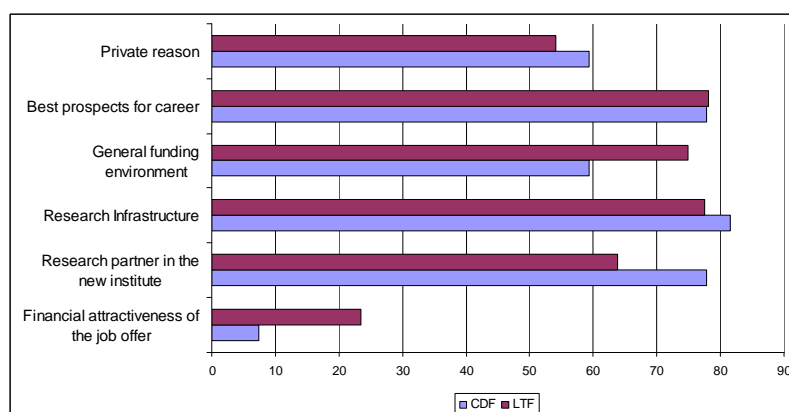
Table 7: Post award employments (actual or planned)

	CDF	LTF
Do not know yet	10	101
Host institution of the award	10	209
Other research institution in country of host	4	63
Original home research institution	3	74
Other research organisation in country of home institution	9	103
Research institution in Third Country	1	48
For profit company in home country		7
For profit company in third country		7
Other		11

Absolute N CDF=27, LTF=470, number exceeding total because of second affiliations

The most important **determinants** for the post fellowship **choice of location** are, according to the respondents, the career prospects most generally and the research infrastructure and general funding environment (especially LTF) more specifically (see Figure 3).

Figure 3: Importance of Reasons for the Choice of Locations Post Award
(share of respondents answering very or extremely important)



3.1.3 The research under the fellowships

A key question for each evaluation is to ask whether the intervention, the funding programme, has enabled the target group to do what they wanted and to do it differently and better than they could have done without the award. When given the statement that they **could perform exactly the research they wanted**, respondents were **overwhelmingly affirmative**, roughly 90% answered to agree moderately or fully (Table 8). This means that fellows are not pushed in certain directions in order to get their awards, but rather can design the projects as they want to.

Table 8: Research: Could you pursue exactly the research you wanted with the fellowship

	LTF		CDF	
	Count	%	Count	%
not agree	2	0,4	0	
agree only in part	30	6,5	2	7,4
indifferent	5	1,1	1	3,7
agree moderately	79	17,1	5	18,5
fully agree	345	74,8	19	70,4
Total	461	100,0	27	100,0

The survey then asked if they had done the project anyway, even without the fellowship, we are aware that this is a hypothetical question and must be read as such, but nevertheless it gives some indication about the added value of the fellowship. 52 % of the CDF and 66% of the LTF would have done their project anyway. This may point to a higher need for those fellows who actually change their discipline to find alternative funding.

Those who said they would have done the project even without funding were then asked where they would have done it and what would have been different in this project. 79% of the CDF who would have done their research anyway would have done it in their host organisation of the fellowship, they would have moved their anyway. This means that 41% of all CDF (11) would have done their project without the funding and would have moved to the host organisation of the fellowship. For the LTF, which entails less drastic move in research areas, the share of fellows who would have moved to their fellowship host organisation out of those who would have done the project anyway is 93%. This means that out of the entire LTF sample, 60% (282 out of 470) would have done the project anyway and would have done so in the host

organisation. Again, we need to stress that we cannot assess how realistic a move would have been without the award.

However, doing a project without the HFSP support would have been quite different. We asked the respondents how the research would have differed, again a hypothetical question to get an idea about the major leverage – beyond enabling the project in the first place and enabling exactly the research the fellows wanted to do.

Table 9: Changes in Research Project without HFSP Funding
(% of those respondents who would have done the research without the funding)

		Not agree	Indifferent	Slightly agree	Agree moderately	Fully agree	Total
The research would have	%	%	%	%	%	%	N
...been less thorough	CDF	35,7	14,3	21,4	21,4	7,1	13
	LTF	40,7	15,3	16,3	18,3	9,5	295
...have had fewer important partners	CDF	28,6	21,4	28,6	14,3	7,1	13
	LTF	35,0	28,6	16,0	10,9	9,5	294
... been with fewer financial resources	CDF	7,1	0	21,4	14,3	57,1	13
	LTF	6,7	6,0	17,1	30,1	40,1	299
...been less cutting edge	CDF	23,1	23,1	38,5	7,7	7,7	13
	LTF	29,4	23,6	17,9	17,6	11,5	296
...been with less suitable equipment	CDF	35,7	28,6	21,4	0	14,3	13
	LTF	32,3	26,9	20,1	11,9	8,8	294
... taken longer	CDF	35,7	28,6	21,4	0	14,3	13
	LTF	33,0	29,3	14,1	14,1	9,4	297
...been with less international collaboration	CDF	42,9	21,4	14,3	14,3	7,1	13
	LTF	37,1	25,2	17,3	11,6	8,8	294
...been with less intercontinental collaboration	CDF	14,3	21,4	21,4	28,6	14,3	13
	LTF	33,1	26,3	17,1	11,9	11,6	293
..had less colleagues form other fields of life science	CDF	35,5	33,4	16,9	8,4	5,7	13
	LTF	28,6	21,4	28,6	14,3	7,1	296
...been with less inter-disciplinary collaboration	CDF	34,6	33,2	15,9	10,8	5,4	13
	LTF	21,4	28,6	28,6	14,3	7,1	295

Note: the total N for LTF is 470, as 33% would have done their projects anyway and some did not answer this question. The total N of CDF is 27, only 13 would have done the project anyway. The percentage thus corresponds to those who would have done the project anyway and answered this question.

We need to stress that this table only represents those who would have done the research. If one adds all those three alternatives for which the respondents slightly, moderately or fully agree, we get a picture of where the fellowship adds most even to those who would have done the project anyway. To highlight only the most obvious results: the fellowship allows a better equipped research (fewer financial resources, around 90% for each scheme), in addition, roughly 50% of the projects would have been less thorough, and less cutting edge. Further, half of the LTF would have had less partner from other fields in life science (collaboration across fields in life science) and two thirds of the CDF say they would have had less intercontinental partners (although the fellowship is not about partnering).

3.1.4 Collaboration and integration

Fellows have to integrate into their host organisation, and ideally they collaborate in their research with partners from the host organisation, with international partners and, as needed, with partners from other areas within life sciences or other disciplines. Therefore, the questionnaire contained one section about the collaboration behaviour.

Most importantly, the integration into the host organisation has been overwhelmingly successful, as can be seen in the table below, the CDF report even slightly higher integration than the LTF.

Table 10: Integration In Host Organisation
Q: How do/did you feel integrated into your host organisation?

	CDF		LTF	
	N	%	N	%
not at all	1	3,7	6	1,3
slightly integrated	1	3,7	33	7,2
neutral	1	3,7	53	11,6
moderately integrated	4	14,8	112	24,5
entirely integrated	20	74,1	254	55,5
Total	27	100,0	458	100,0

The HFSP induces **new collaboration** at various levels. Asked if those who collaborated in their project did so with partners with which they had collaborated prior to the award, only 7% of the CDF and 9% of LTF indicated to do so. Most obviously, and in the spirit of the HFSP fellowships, the HFSP fellowships induce collaboration **within the host organisation**. Only a minority of CDF (8%) and LTF (18%) did not collaborate at all during their fellowship within their host organisation. Collaboration did not stop in the host organisation, however. A **majority** of CDF (70%) and LTF (60%) **collaborated beyond the host organisation**. Further, 52% of all CDF fellows and 40% of all LTF fellows collaborated with researchers outside the country of their host organisations, and the overwhelming majority of those international project contained **new international collaborations** for 12 out of the 27 CDF fellows and 140 out of the 470 LTF fellows in the sample. 37% of CDF fellows and 23% of LTF fellows also collaborate with inter-continental partners, and again, the vast majority of those inter-continental collaborations are new for the fellows. Again in numbers: 9 out of the 27 CDF and 104 out of the 470 LTF report **new inter-continental collaborations** in their fellowship. Finally, the collaborations started within the HFSP persist for a majority of fellows even after their fellowship has finished (81% of finished CDF, 56% of finished LTF). Given that fellows are in the beginning of their careers, these values appear high, and especially as the HFSP fellowship is not primarily about international and intercontinental collaboration.⁹

A strong majority of respondents also indicated that their future options for international and inter-continental collaboration have improved (to various degrees), meaning that the HFSP contributes to future collaboration both with partners of the fellowship projects, but also more generally (see table below).

⁹ At this point, we still lack a clear comparator group in life science, and in a later stage of the project we will interpret this result in the light of inter-continental collaboration in life science more generally (based on the bibliometric data).

Table 11: How HFSP affected future options for international and international collaboration

	LTF		CDF	
Future options for international collaborations have.				
	N	%	N	%
Not improved at all	24	5,4		
Slightly improved	27	6,0		
Improved moderately	92	20,6	2	7,4
Improved considerably	171	38,3	12	44,4
Hugely improved	86	19,2	12	44,4
Too early to tell	47	10,5	1	3,7
Total	447	100,0	27	100,0
Future options for intercontinental collaborations have.				
Not improved at all	38	8,5		
Slightly improved	41	9,2		
Improved moderately	99	22,2	1	3,7
Improved considerably	147	33,0	16	59,3
Hugely improved	74	16,6	9	33,3
Too early to tell	46	10,3	1	3,7
Total	445	100,0	27	100,0

Beyond international collaboration, the HFSP is about collaborating with other areas **within life science** and even outside life science. 70% of all CDF and 45% of all LTF cooperated with other areas within life science, which is slightly above the share of fellows in both schemes who had had collaboration with other life science areas prior to the award. As for collaboration with area **outside life-science**, as to be expected, the CDF are much more involved than LTF. 63/ of CDF fellows, who in principle are trained in an area outside life science themselves, have or had collaboration outside life science, while 18% of the LTF fellows have done or do so. Again, the shares are slightly higher compared to the collaborations prior to the award.

For the CDF, the most important collaboration discipline is physics (in various variants); there are no obvious key disciplines to collaborate with, with 10 fellows reporting cooperation in various variants. For the LTF, the breadth is even stronger, as respondents have indicated their partner disciplines in an open text field. Physics and computer sciences and mathematics in their various forms and combinations are most important.

A vast majority of fellows indicated that the capability to cooperate across disciplines has “hugely” improved (89% of CDF and 36% of LTF). Equally, 85% (CDF) and 55% (LTF) report that capability for cooperation within life science has “hugely” improved (with a large number of LTF who cannot (yet) judge). Apparently, the CDF idea to improve collaboration cross disciplines is working very well.

As the HFSP inspires inter-disciplinary collaboration and collaboration across Life Sciences, respondents were asked what, in general, were the hurdles to actually engage in those collaborations. Table 12 below indicates the share of those who responded to the question and rated the issue either a significant or a big problem. For inter-disciplinary cooperation, the funding opportunities and the problem to understand the approaches of colleagues are most often rated as problems. CDF fellows rate finding academic journals more often as a problem, while LTF see the dependency on senior researchers (who might not be willing to engage in new collaboration) as a problem. In general, for collaboration with other areas within Life Science LTF fellows, being life scientists, are less concerned, except for the dependency on senior scientists which might hamper. The CDF, coming from outside life sciences, are a bit more hampered, especially as regards journals. However, looking at it from the positive end, the number of fellows who do not see a (significant) problem for interdisciplinary and inter-area collaboration is considerable.

Table 12: Collaboration Hurdles With Other Disciplines or With Other Areas within Life Science (percentage (out of all who answered this question) of those who rated the following issues as a *significant* or *very big* problem)

Hurdles for collaboration with other disciplines	CDF	LTF
Understanding of approaches among colleagues from different areas	37	37,2
Finding appropriate scientific journals for publishing scientific results	26,9	10,9
Academic reward system does not reward inter-disciplinary approaches (e.g. peer review)	19,2	23,1
Younger scientists are hampered through their dependency on senior scientists	18,5	38,7
The often found perception that inter- disciplinary research would be less solid and have less valuable results than mono-disciplinary research	11,5	19,1
The availability of funding opportunities for early career scientists to do interdisciplinary research	37	38,5
Hurdles for collaboration across areas within Life Science		
Understanding of approaches among colleagues from different areas	25	17,4
Finding appropriate scientific journals for publishing scientific results	30,4	8,9
Academic reward system does not reward inter-disciplinary approaches (peer review etc.)	13	12,1
Younger scientists are hampered through their dependency on senior scientists	26,1	30,3
The perception that research with other areas in fundamental science would be less solid and have less valuable results than mono-disciplinary research	21,7	13,1
The availability of funding opportunities for early career scientists to do interdisciplinary / across area research	17,4	27,6

* There are on average 50 missing values in LTF and 4 in CDF

Finally, complex collaboration pays off. Asked for the overall **benefit – cost ratio** of collaboration **across life science**, **59% of LTF** and **74% of all CDF** who answered that question experienced **much more or slightly more benefits than costs**. For **cooperation across disciplines**, the benefit cost ratio is slightly different, with **50% of LTF** and **85% of CDF** indicating **overall positive benefits** (slightly more benefits or much more benefits).

3.1.5 Change of Research Disciplines

The HFSP wants to encourage change of discipline, a fertilisation of sciences through those changes. This is the major impetus of the CDF programme. Therefore, we have asked respondents if they ever changed disciplines (even if temporarily). 89% of the CDF have done so and 19% of the LTF. We then asked for the discipline trajectory before, during and after the award. For the LTF the numbers of people having been in other disciplines or changed from other disciplines are rather low. For the CDF, however, there is an interesting development. Life science, obviously, gains in importance, and it does so only partly to the detriment of other disciplines. It appears that some fellows see themselves entirely as life scientists during and after the award, and others add life sciences to their existing profiles, the number of double affiliations has grown considerably.

Table 13: Disciplines of fellows before, during and after their award

	CDF			LTF		
	before	during	after	before	during	after
Life Sciences	3	24	23			
Chemistry	4	1	3	17	6	11
Physics	17	8	11	16	6	7
Mathematics		1	1	5	6	8
Engineering and Technology - Computer Science	3	2	2	7	8	11
Engineering and Technology - Other than Computer Science	4	3,0	3	4	2	6
Other disciplines	2		1	10	10	10

The motivation to change disciplines was mainly to get new knowledge and skills to work on new research interest. 92% of all CDF rate the motivation high or very high, and to a lesser degree about improving the possibility to link with colleagues from neighbouring fields (62% of CDF). The values for the **benefits** out of changing disciplines are slightly higher than the values for the motivations, which could mean that the change in discipline has met or exceeded the expectations. 11 of the CDF state that they would have changed disciplines even without the HFSP, 6 would not have changed disciplines without HFSP (22 LTF also reported that they would not have switched without the HFSP¹⁰).

As the HFSP fosters change of disciplines, it is important to know how the fellows rate the hurdles for a change of disciplines. All fellows that had indicated to have changed disciplines once in their careers were asked this question. Even among those, the share of fellows perceiving big or significant problems is high. The major problem is the gap in publication, the loss of time, through adapting to a new discipline, followed by the problem to find funding in a new discipline, the link of career to one's established discipline and the build up of professional reputation. One interesting finding is that CDF fellows appear to be less concerned with getting recognition of peers or getting into relevant networks (see Table 14).

Table 14: Hurdles for changes of disciplines
% of those indicating it to be a very big or a significant problem*

	CDF	LTF
Academic positions do not allow the freedom to change disciplines	50	46,4
Academic careers and offers are linked to one's established disciplines	66,7	67,0
Obtaining funding in a new discipline is difficult	70,8	72,6
Professional recognition is hard to build	62,5	75,2
Gap in publication record (time to adjust/publish)	79,2	79,6
Getting published in different scientific journals	47,8	40,7
Getting recognition from colleagues / peers	37,5	61,9
Getting into the relevant network of colleagues	45,8	63,1

N CDF=24, N LTF=113* asked only those respondents who had changed discipline once in their lives

To better understand the consequences of switching disciplines, the questionnaire confronted the scientists with a set of statements (see table below). In sum, those experiences are positive, the skills and knowledge brought into life science research are appreciated and used and inspired colleagues, especially in terms of techniques (where most trained students and colleagues with their techniques), but also more generally in the way they perceived life sciences (still above 50% agree/strongly agree). A minority of the CDF perceive problems to publish. Most importantly, **a small minority did think that the duration of the CDF is sufficient to build up a standing as independent researcher** (but most could not assess, yet).

Table 15: Assessment on conditions and consequences of having changed disciplines
% of those who agree or strongly agree *

	CDF	LTF
Your presence in the new laboratory changed the way other scientists were thinking about life sciences	58,3	54,8
Your special knowledge and skills were fully appreciated by other scientists in the lab	79,2	73,3
Your background training and skills stimulated discussions about alternative/new approaches for the mainstream research in the host laboratory	87,5	74,8
Attempts were made to use methodological approaches / techniques that you did bring with you (e.g. quantitative techniques)	87,5	73,9

¹⁰ This does not only involve the early years in our sample, also some recent awardees.

You actively trained students and other post-docs in those approaches	70,8	65,8
Your role in the fellowship project could have been done without your special disciplinary skills and knowledge	8,3	17,9
It was / is difficult for you to publish in life science journals	39,1	13,3
The CDF including up to two years of deferral provides enough time to establish yourself as a young investigator in the life sciences?	13 (56,5% indifferent)	n.r.

N CDF=24, N LTF=113* asked only those respondents who had changed discipline once in their lives

Next to the analysis of switching disciplines, the survey also included a set of questions as to switching areas within life sciences, since this is a major purpose of the fellowship. 72% of all LTF have changed their major research area within life science, but more than half of those did it during their fellowship rather than before.¹¹

While other programmes, including the EMBO, allow for some change of research area when applying for a fellowship, the HFSP is much more radical in its approach – and thus fills a unique gap. In the interviews with four LTF awardees and two CDF awardees, the HFSP schemes were highly praised for giving the flexibility and the freedom to attempt changes of research focus, area or even discipline, especially as such a move most often means a lack of proven excellence and publications in the new areas. For most alternative programmes such a gap is often prohibitive, while in the case of the HFSP the judgement of the basic idea, the proven capabilities in general of the awardee and the quality and credibility of the host supervisor and her laboratory is decisive. The EMBO, as the one most obvious comparator, also focuses on those criteria rather than relying on the track record in a given area. Thus, EMBO appears to be risk taking to some degree, allowing for – and even asking for – some deviation from the proven track. However, HFSP goes further, takes more risk and for doing so is praised by awardees.

However, there are a few – and not very broadly shared – concerns around this approach. The radical approach of the HFSP could lead to an artificial extending of boundaries in order to fulfil the change criterion, stretching the ambitions for change beyond what would be desirable. While this issue in principle can be assessed during the ex ante evaluation, a more serious concern cannot, i.e. the difficulties of actually adjusting to a new area or even discipline. As the data and our interviews show, this normally works out nicely, but various interviewees indicated that the link to colleagues of other areas is challenging, very time-consuming and can be at times frustrating. Therefore, for a starting period, the opportunity to have a mentor who supports the transition and new links was discussed and rated as being desirable.

3.1.6 Impact on the host organisation

The HFSP scheme is connected with a high status of the awardee and considerable funding. As many of the projects are not only leading edge, but are new combinations of science areas and even different disciplines, it is important to know if the fellowship has triggered some change in the host organisations. In a later stage of this evaluation, the host organisations will be surveyed as well. Therefore, we limited these questions to a minimum.

First we asked if the fellowship allowed for areas that were not represented in the home organisation of the fellow. 85% of the CDF (N=26) and 75% of the LTF (N=420) confirmed this. This is important, as it indicates that through the move the fellows did get the possibility to perform their work in a more suitable environment.

¹¹ The final report will contain an analysis of the representation and switches of fields as well as of motivations for and benefits of those switches. This interim report has focused on change of disciplines in order to shed light on the CDF scheme mainly.

The HFSP awards do indeed have some impact on the host organisations, at least in the perspective of the awardees themselves. Most importantly for the CDF, almost half of the respondents perceive a major change towards more inter-disciplinarity and 37,5 % perceive more flexibility of research areas. The most important change regarding the LTF is that their host organisation has given young researchers more autonomy, which means that the finding instrument targeted towards an individual influences the governance within host organisations for 40% of all LTF (and 26% of CDF).

Table 16: Changes the award triggered in the host organisations*
Did your award trigger ...

	CDF	LTF
more flexibility as regards research areas	37,5	27
more inter-disciplinary research	47,8	17,8
more international collaboration	26,1	19,7
giving young researchers more autonomy	26,1	39,3
...enhanced the prestige of the laboratory and/or institution	31,8	27,3

* Answers % of those who indicate a **major** change

3.1.7 Deferral and the Repatriation in the Third Year

The questionnaire explored two specific features of the fellowships, the deferral, i.e. the possibility to put the last year of the financing on hold for two years in order to take advantage of the funding opportunities, and the possibility to spend the third year of the fellowship in the home country (repatriation). First of all, the possibility of a deferral is not known to all fellows, 50 LTF who received their grant after 2001 did not know the existence of the deferral. 2 out of the 9 CDF and 9 out of the 84 LTF in the sample who are still within their first two years plan to actually take advantage of the deferral.¹²

As regards the opportunity to spend the last year in another country than the host country, 7 (out of the 27 CDF answering) and 58 LTF fellows (out of 343) plan to spend or have spent the third year away from their host organisations. For almost all of them this is the home country (deviations due to spouse country being different from home country). However, only a minority of those who went or will go to their home or spouse country actually go back to their home institutions (2 CDF and 18 LTF). The reasons for going back are mainly to build up an own group or lab in institution in home country, and private reasons (see table below).

Table 17: Reasons to spend the third year at home

	CDF	LTF
Building up of own group in home institution	2	18
Building up of own lab in home institution	2	10
Private reasons	3	16
Lucrative job offer for after the award		4
Other	1	1
Total	8	51

27 out of 46 LTF fellows and 4 out of 7 CDF fellows who return(ed) home agree or strongly agree that without the HFSP they would not have integrated the necessary level into their home

¹² When asked about taking advantage of the deferral, only 2 LTF indicated that they did, out of 470. This low figure will be checked with the HFSP Secretariat.

country, indicating that for the majority of those who return home the HFSP is needed for re-integration. 31 LTF indicate that without the LTF they could not have built up (or build up) a group in the home country institution. This means that the possibility to return to the home country is not yet accepted too widely, but for the majority of those who take advantage of it, it is an indispensable mechanisms to re-integrate and to build up new structures in the home country (analysis for country needed). The table below shows the home and host country for those LTF and CDF who have reported to spend or plan to spend the last year in the home country. One interesting observation is the high number of French LTF, while not many developing or emerging economies appear.

Table 18: Host and home countries of those fellows taking advantage of third year at home

CDF				LTF			
Host country		Home country		Host country		Home country	
France	1	Australia	2	Australia	1	Australia	4
Germany	2	India	1	Belgium	1	Canada	1
UK	2	Spain	1	Canada	2	Denmark	1
USA	2	Sweden	1	France	5	Estonia	1
Total	7	USA	2	Germany	2	Finland	2
		Total	7	Netherlands	3	France	12
				Sweden	2	Germany	7
				Switzerland	2	Israel	1
				UK	6	Japan	4
				USA	34	Netherlands	2
				Total	58	Poland	1
						Spain	1
						Sweden	1
						Switzerland	4
						UK	4
						USA	12
						Total	58

Interviews further qualified the repatriation activities of the HFSP programmes – which also have to be seen in the context of the CDA programme. The effort of the HFSP are clearly praised and understood. The problem for awardees lies with the institutional situation in some of the home countries, as some countries just do not offer the variety of excellent organisations that would be needed to continue a specific line of research on highest level. The fellowship is based on choosing first rate institutions abroad, and in some instances this cannot be matched in the home country. Furthermore, repatriation is also about building a career, and not in all cases can the home country offer the high quality positions.

3.1.8 Output and Impact

The key aim of the HFSP fellowship is to build up the standing and career of young excellent researchers. A major means to measure progress is of course through academic impact which is done in the bibliometric analysis performed in the context of this evaluation. However, respondents were asked a set of more qualitative questions to self-assess the impact the HFSP award had on them.

Table 19 shows the level of agreement for the different types of impact asked for. It differentiates between “agree” and “strongly agree” in order to illustrate the share of awardees who feel strong positive impact. Overall, the impact is felt to be positive or very strong. The highest impact on this basis is on the **career development very generally, with 100% of CDF and 90% of LTF agreeing or strongly agreeing**. A further indication for **career development** is that 27% (N=115) of LTF answering the question indicated that they obtained a position **during** their fellowship, and 20% (5) of the CDF.

Table 19 further shows the **reputation** and **visibility** effects are extremely strong, and especially for CDF the award opens doors to the relevant (new) communities. Equally, the CDF fellows feel strongly about broadening horizon through their award

As for peer reviewed journal publication, the impact is felt to be least strong, both in terms of speed and in terms of number of co-published articles. Still (not shown in this table), 32 % of CDF and 42 % of LTF disagree or strongly disagree to the statement that the award accelerates the peer review publication activity. However, the CDF appears to help cross-disciplinary scientists to broaden their publication options.

Table 19: The impact of the fellowships. The award...

accelerated the rate of peer reviewed publication		
CDF	Agree	24,0
	Strongly agree	4,0
LTF	Agree	18,3
	Strongly agree	7,1
broadened the kinds of journals I publish in		
CDF	Agree	68,0
	Strongly agree	20,0
LTF	Agree	28,3
	Strongly agree	8,4
broadened up the research fields I am working in		
CDF	Agree	52,0
	Strongly agree	48,0
LTF	Agree	43,4
	Strongly agree	28,5
heightened my international visibility		
CDF	Agree	37,5
	Strongly agree	45,8
LTF	Agree	48,7
	Strongly agree	32,8
increased my reputation		
CDF	Agree	20,8
	Strongly agree	66,7
LTF	Agree	47,6
	Strongly agree	36,5
improved my access to key communities		
CDF	Agree	56,0
	Strongly agree	36,0
LTF	Agree	44,6
	Strongly agree	18,9
broadened my scientific horizon (methods / themes)		
CDF	Agree	24,0
	Strongly agree	76,0
LTF	Agree	44,4
	Strongly agree	38,2
increased the number of co-published peer review articles with international partners outside my host institution		
CDF	Agree	12,0
	Strongly agree	20,0
LTF	Agree	19,6
	Strongly agree	8,0
the award had a crucial positive effect on my career development		
CDF	Agree	22,2
	Strongly Agree	77,8
LTF	Agree	32,5
	Strongly Agree	58,1

3.1.9 Conditions of the awards and HFSP communication and community

The respondents were asked to assess the various conditions of the awards. First of all, the duration of the award was exactly right for two thirds of the CDF and 50 % of the LTF, with one

third of CDF and slightly less than half of the LTF assessing the awards as being too short. No respondent assessed the award as being too long. The **living allowance** is overall assessed as **adequate or good**, with 15% in both schemes feeling it is too low. The **deferral** is judged as being helpful or very helpful by roughly 60% of the CDF and 50% of the LTF (and one third in both schemes being neutral). This is interesting, as we have seen above how few scientists actually have taken advantage of the deferral. The **travel allowance** is a very welcome means for the fellows, 90% of the CDF and roughly 70% of the LTF say it was very much helpful.

Interviews around the duration and the general conditions of the grants in fact confirmed the survey findings: the duration of the HFSP fellowships was rated generous, especially as compared to the most important comparator, EMBO, but still, especially for CDF, the need for slightly more time was expressed, as much time is needed to adjust before the actual production of output can start. On the other hand, and in line with the experience around the EMBO fellowship that runs 2 years, fellows who need more time on their funded project most often can find it with other grants for institutional support of the host organisation. In fact, the ability to raise this supplementary or complementary money after three years can be seen as a proof of successful research and output production. As the host survey shows (below), host organisations are often ready to add-on to the fellowship budget in a majority of cases. However, for the challenging CDF some flexibility may – on a case by case basis – be helpful.

Communication to potential fellows is important to inform the entire target group of the scheme. Table 20 shows how fellows learned about the scheme. By far the most important means is the web site, followed by mouth-to-mouth reputation through existing fellows.

Table 20: How fellows learned about the fellowship

	CDF	LTF
HFSP grant holders/Fellows	7	137
Direct information from other persons affiliated with HFSP (e.g. present or past reviewers, members of review committees, council of Scientists)	0	18
The HFSP web site	7	157
The HFSP call for applications mediated through domestic institutions	1	29
The call for applications in scientific journals (print or online)	2	19
Presentations by HFSP staff	0	9
None of the above	0	3

Communication to fellows is important to inform about events, changes in procedures and management and outcomes and to form an identity. Table 21 shows how intensively fellows use the various communication means and how satisfied they are. The **website** is clearly the most important means and assessed very favourably, while the **newsletter** is less importance and assessed less favourably.

Table 21: The usage of and satisfaction about HFSP information means

	Used*		Satisfied**	
	CDF	LTF	CDF	LTF
HFSP web site	55,6 (40,7)	34,3 (41,1)	92,3	63,2
HFSP e-mail newsletters	15,4 (50,0)	18 (36,3)	57,1	43,7
HFSP Annual Reports	7,7 (34,6)	12 (33,9)	52,6	39
	27	411	27	411

* % of respondents indicating to use often or intensively (brackets: those using moderately)

** % of respondents that are very or extremely satisfied

The HFSP is regarded as a world leading funding organisation. Against this background the survey asked if the fellows are/were part of a particular HFSP community. While the vast majority of fellows have some sense of belonging, the share of those who feel this belonging “very much so” is around 12% for LTF.

Table 22: Share of respondents feeling as part of a particular HFSP community

	CDF		LTF	
	N	%	N	%
Not at all	1	3,8	49	11,6
Rarely	6	23,1	119	28,3
In a number of occasions	7	26,9	132	31,4
Frequently	5	19,2	69	16,4
Very much so	7	26,9	52	12,4
Total	26	100,0	421	100,0

The **annual meetings** are one means to build up community and networks. They are attended by 60% (of those who answered the question).

Table 23: Attendance of HFSP annual meetings

	CDF		LTF	
	N	%	N	%
Have you attended the annual HFSP meetings?				
Yes, once	8	30,8	184	43,2
Yes, more than once	8	30,8	74	17,4
No	10	38,5	168	39,4
Total	26	100,0	426	100,0

The **importance of the meetings are considerable** – and in general rated higher by the CDF than by the LTF. Overall, the highest score is given to the **importance for the visibility** of the **HFSP** (60% of LTF rate the meetings to be very or extremely important, 70% of CDF do so) and the **work it funds** (58%, CDF 60%). The meetings are also regarded considerably important to **build new networks** (50% LTF, 80% CDF) and slightly less for maintaining networks.

One further means to build up a stronger HFSP community and identity is an **alumni organisation**. This would clearly be **welcomed** by the majority, 58% of LTF and 73% of CDF would be clearly interested, another 34,5% (LTF) and 27% (CDF) would be partly interested.

As in the CDA and YIG, the interviews with fellows clearly confirmed the need for some more systematic networking of those funded and of former awardees. Some interviewees even ask for a more pro-active role of HFSP networks in the proposal stage, as service for matching teams. More widespread and realistic is the idea that the HFSP secretariat should not be some active team-builder, but advertise and intensify the networking activities around the HFSP. The annual conference has been praised for providing the necessary platforms, but more fora, online even, might be useful, especially as the HFSP community shares the experience of high-risk, trans-disciplinary research.

3.1.10 Comparison with other programmes

The respondents were asked for overall assessments and comparisons to other programmes. First, they should name a programme that could have funded their research instead of the HFSP. The programme by far the most often named is EMBO 141, followed by Marie Curie 36, the Japan Society for the Promotion of Science (7), after that there is an enormous number of schemes that are only named once or very few times.¹³

125 LTF fellows and 14 CDF fellows did actually try to get an award in one other scheme, 125 LTF fellows and 2 CDF actually were successful. The successful once were then asked to rate some features and the overall benefit of the alternative programme with the HFSP. Table 24 shows how the fellows rated the alternative programme to the HFSP. **Across all categories** that were asked for, the HFSP was rated **considerably better** or equally good, there are only **extremely few cases** in which the comparator programme was rated (slightly) stronger. The HFSP is extremely strong in providing inter-continental cooperation, risk taking and moving across fields. Equally, the fellowship duration seem to be beyond the standard for comparators, in combination of a strong and above comparator level of general enumeration this appears to be a strong package.

Again, interviews compared the relatively generous package of the HFSP fellowships to other schemes, praising the duration (even if one interviewee would like to see even longer fellowships) and the allowance, especially the spouse and child support.

Table 24: How other programmes compare to HFSP. Other programmes are...
(responses in %)

	Considerably weaker	Slightly weaker	The same as HFSP	Slightly stronger	Considerably stronger	N
Living allowance	37,3	41,3	9,5	8,7	3,2	126
Administrative support	16,7	20,6	56,3	4,0	2,4	126
Duration	52,3	17,2	25,0	5,5		128
Providing prestige that helps in further career (grants, partners)	16,8	39,2	41,6	1,6	,8	125
Linking to global excellence	10,4	36,8	50,4	2,4		125
Allowing to take high risk	17,1	33,3	48,0	1,6		123
Enabling cross-disciplinary collaboration	23,8	32,8	42,6	,8		122
Enabling moving into a new field without track record in this field	19,4	26,6	54,0			124
Enabling inter-continental collaboration	17,9	29,3	52,8			123

Note: 2 CDF, rest LTF, no separate comparison

It is interesting to see which programmes were rated as being better (even if only in few cases). The programmes mentioned as better or slightly better than the HFSP in terms of allowance (most cases) are Marie Curie IIF (3), EMBO (3), DFG, JSPS, Canadian Institute for Health Research, FEBS, NYSCF, Swiss National Foundation, NHMRC (Australia) - CJ Martin Fellowship. A second comparator category could be "prestige to help further career". Out of the 53 cases which rated the other programme *equally good* (51) or *stronger* (only 3), 36 named EMBO, 6 Marie Curie and 2 the Japan Society of the promotion of science.

¹³ A full list of programmes mentioned will be delivered to the HFSP separately

Compared to EMBO the duration of the HFSP fellowship is the major difference, and it is linked to the higher risk-taking and shifting of areas / disciplines which are much more pronounced within the HFSP scheme. HFSP also remains more systematic inter-continental in its outreach. Thus the two major differences of HFSP remain. However, the EMBO institutional innovations, installation grant and global exchange programme, somehow move into HFSP territory in terms of supporting structure building and in terms of the underlying rationale, but appear not to be intended to converge into schemes and logics of HFSP.

European Molecular Biology Organisation¹⁴

The European Molecular Biology Organisation (EMBO) has been named as comparator to HFSP most often. The programme management of EMBO and the HFSP secretariat know each other's schemes and co-ordinate in terms of deadline of calls. EMBO does not have a grant scheme comparable to the YIG, the PG or the CDA. It has two relatively minor schemes (in terms of comparative funding offered, not in terms of impact, this is not to be assessed in this report), the Young Investigator Programme that provides some additional funds for networking, travel and other minor investment of grantees, but is in no way comparable to the YIG of the HFSP, and the Global Exchange Programme. It also has a short fellowship programme that it rates as great success and that will continue to have importance. As shown in this LTF surveys, the most obvious comparator is the long term fellowship of the EMBO.

The EMBO LTF is slightly bigger in terms of applications and awardees, between 2000 and 2008 the EMBO LTF had 1.6 times as many applicants and 1.9 times as many fellows as the HFSP, the success rate of the LTF is 18% and thus constantly slightly higher than the HFSP LTF (see Table 25) In recent years, the EBMO had an enormous growth of applications, not matched by a similar growth for the HFSP fellowship.

Table 25: applicants and success rate EMBO LTF and HFSP LTF between 2000 and 2008

	EMBO LTF	HFSP LTF
Applications	9333	5628
Awards	1654	861
Success rates	18	15,3

Sources: EMBO (2009): Annual report 2009, Heidelberg, p. 94 and HFSP (2008): Annual Report 2009, Strasbourg

The range of countries from which scientists applied is broad, 27 European countries, Israel and the USS are mentioned, but there are two further categories Eastern Europe (9) and "others" (15). The coverage in terms of number of countries is in the EMBO, but EMBO is more Eurocentric than the HFSP, the global character (Latin America, Asia) of HFSP sticks out. However, EMBO has started to actively engage with Asian countries in its Global Exchange programme. Yet rather small scale, could this networking programme be the seed for more global outreach of the programme in the long run.

The HFSP is more attractive to applicants because it offers three year funding compared to the two years of the EMBO. The EBMO experience cases of switch from EMBO to HFSP fellowship, one of our interviewees also described how she changed because of the better conditions with the HFSP in terms of duration.

¹⁴ This short characterisation is based on intensive document analysis and a 2 hour in-depth interview with a key representative of EMBO.

The EMBO has discussed the duration of their long term fellowship scheme at various times. It has analysed in the past that up to 95% of fellows find themselves employed by the host or other organisations, the third year, which is deemed important for many research projects, is thus most often well covered. The trade off between a higher number of fellows and a shorter duration has been decided in favour of the higher numbers.

The EMBO does not offer specific schemes for cross-disciplinary project. It allows changes and welcomes inter-disciplinarity; it also requires that applicants shift their focus from the PHD slightly, to have a significant training effect and not simply replicating their basic PhD approach. However, the EMBO is not equally focused on change of areas or discipline. While it is risk taking, it allows for slightly less discontinuity in the research programme of the applicants. The evaluation committees have slightly enlarged the share of non life-scientists, but EMBO still concedes the potential difficulties in evaluating cross-discipline fellows. Risk taking in EMBO is provided through evaluating the potential of the candidate, the scientific quality of an idea and the quality and commitment of the host, and by not evaluating the likelihood of “success” nor monitoring the progress in any great detail.

EMBO also does not foster re-patriation with specific schemes like the HFSP or through the obligation to give the money back should the out-going fellow stay abroad (as with Marie Curie). Although there have been, from time to time, discussions about the advantage that non EMBO countries might have through mobility from EMBO fellows to those countries. However, EMBO has found in an internal study that 75% of the fellows have returned to their original countries four years after the fellowship had finished (interview EMBO). Thus, rather than insisting on immediate return EMBO relies on natural brain circulation once certain mid-term projects are finished. EMBO, it seems, has taken a slightly different route in the balance between supporting structures in home countries on the one hand and taking the risk of pulling researchers into situations in which they do not find adequate framework conditions and long term employment on the other hand. However, one additional instrument financed by a sub-set of countries within EMBO is the Installation Grant, which gives 50000 EURO per year for researchers active in the participating countries. The evaluation selection criteria are the same as for the Young Investigator Grant, the number of grantees has dropped from 13 down to 5 in 2009.

A set of further noticeable differences between HFSP and EMBO are:

- The share of female researchers is higher in EMBO fellowships than it is in the HFSP programme, which appears less attractive for women.
- The LTF is supported by a STF scheme that is a much broader part of the training philosophy of EMBO. The success rate is 50%, the funding has a high focus on PhD students and has a broader global outreach than the LTF, whereby inward mobility into EMBO memberships is by default 12 weeks to ensure embedding and benefit for the host organisation. The scheme shall be a catalyst for training progress and for trying out new things. However, the STF is not intended to be a bridge into the LTF, the share of LTF having been STF Fellows is rather small.
- The mobilisation of EMBO members for the interviews in the second stage of the evaluation procedure, which signifies a high commitment of the EMBO members (individuals).
- The EMBO publications provide an internal high level publication opportunities, but in doing so appear to contribute to the EMBO community building.

In sum, the EMBO and the HFSP both remain considerably different. The duration of the fellowship is the major difference, and it is linked to the higher risk-taking and shifting of areas / disciplines which are much more pronounced within the HFSP scheme. HFSP also remains more systematic inter-continental in its outreach. Thus the two major differences of HFSP remain. However, the institutional innovations, installation grant and global exchange

programme, somehow move into HFSP territory in terms of supporting structure building and in terms of the underlying rationale, but appear not to be intended to converge into schemes and logics of HFSP.

Marie Curie Fellowships

There are two Marie Curie awards available under the EU Framework 7 Programme which in some part resembles aspects of HFSP fellowships. These fellowships are available to researchers from all disciplines but none however are explicitly cross disciplinary. None offer the extensive duration of the HFSP fellowships. Both have clear required reintegration or repatriation elements.

While most of the respondents did not mention a specific Marie Curie grant when reporting about a comparator programme, the Marie Curie Incoming International Fellowships (IIF) were mentioned by 3 HFSP fellows as affording better allowances than HFSP. The IIF are global-reach individual fellowships that aim to attract top-class researchers from third countries to work and undertake research training in Europe from 1 to 2 years (incoming phase), with a view to developing mutually-beneficial research co-operation. That means neither countries that are neither EU Member States nor Associated Countries. Eligibility requires a doctoral degree or at least 4 years' full-time equivalent research experience, application for an IIF is made in liaison with the organisation or institution that would be willing to act as a host in Europe. Host organisations can be universities, research centres or companies. In the case of emerging and transition economies and developing countries, the scheme may assist fellows to return to their country of origin for, typically, half the duration of the first phase (re-integration phase). Proposals from all areas of scientific and technological research of interest to the European Community are accepted and there are no pre-defined priority areas. The allowances available for this fellowship are currently under review and are not available but like the IOF mentioned below they operate on a contractual basis.

In parallel with the IIF and aimed at outgoing European researchers are the Marie Curie Outgoing Fellowships for Career Development (IOF). These are available for a maximum of 36 months including both the outgoing and return phases. The aim of the IOF is to reinforce the international dimension of the career of European researchers by giving them the opportunity to be trained and acquire new knowledge in a Third Country high-level research organisation. The intention is that these researchers will return with new acquired knowledge, competences and experience to an organisation in a Member State or Associated country. Eligible researchers have to come from an EU Member State (MS) or an EU Associated Country (AC). They must at the date of the application deadline be in possession of a doctoral degree or have at least 4 years full-time equivalent research experience after obtaining the degree which allows them to embark on a doctorate. The IOF provides financial support to a European fellow completing a research and training project for 1 or 2 years (typically 18 months) in an overseas institution then returning to the European host institution for 12 months. It is mandatory that a period of reintegration at the European Host institution is undertaken following the researcher's outgoing phase. If the reintegration period is not undertaken, contractual conditions would require reimbursement to the European Commission of the total costs of the fellowship.

Funding is provided on the basis of an agreed "personal career development plan". The award is 100% and includes a salary for the researcher. The fellowship covers a stipend for the duration of the project, overheads for the project administration, travel and limited funding for other research activities during both the outgoing and return phases. The value of fellowship is calculated to include cost of living adjustments and therefore varies according to country of residence during the outgoing phase. The financial regime covers eligible expenses for activities carried out by the researcher and eligible expenses for host organisation activities. The researcher is entitled to a monthly living allowance (corrected for cost of living): a mobility

allowance for trans-national movement is paid of Euro 800 per month for those with family obligations and EUR 600 for those without. A further contribution to the participation expenses of the researcher is managed by the hosting organisations (for both the outgoing and return phase). This comprises a fixed sum of €800 per researcher for lab based research projects and €500 per researcher for non lab based research projects. Management costs and contributions to overheads are paid as a fixed amount of EUR700 per researcher-month and cannot exceed 20% of the total direct costs. A calculated example has been extracted from the Guide for Applicants for International Outgoing Fellowships (Marie Curie Action March 2009) which gives some indication of an IO Fellowship value. A researcher with 6 years experience and family obligations going from Lisbon (where s/he has always resided and worked) to Harvard (USA) for a 2 year outgoing phase plus a 1 year reintegration phase in Lisbon and under an employment contract (to guarantee social security parity) and with location of origin in Portugal would receive a fellowship valued in total at EUR 233,225.

In sum, the Marie Curie has fellowships for both directions, has some global outreach, has a strong focus on re-patriation of outgoing European researchers and some support of brain circulation and repatriation as regards incoming fellows from emerging countries. It is not specialised in any scientific area and, while in general a prestigious award, cannot match the prestige of a HFSP fellowship in the life science area.

3.2 Fellowship Host Survey

During the early stages of the review, the HFSPPO asked the evaluation team to extend their analyses to include a survey of host organisations for the LTF and CDF schemes. Host supervisors themselves play an important role in assessing applications for fellowships in terms of the originality of the proposed project, the applicant's intellectual contribution to the project and the specific skills and techniques that Fellows would bring to benefit the host laboratory¹⁵. Moreover, just as fellows as newcomers to a laboratory are influenced by the research and institutional context of a lab, they also have impact on this research and context.

The purpose of this additional survey was to begin the process of understanding the impact and appropriateness of the HFSPPO hosted schemes for long term and cross disciplinary fellowships. This complements the perspectives of the fellows as analysed in the fellow surveys.

The Survey was structured under the following headings

- Background information about respondents
- The Laboratory
- Impact of the Fellowships
- Funding Flexibility and Recruitment

In addition there was a section at the end of the Survey for any comments that respondents wished to make about the HFSPPO supervised Fellowship schemes

3.2.1 Methodology and Sample

The overall number of people (supervisors and awardees) listed in the HFSP databases of the LTF and the CDF 3141. Out of those, 994 were host supervisors for 2445 awards (per supervisor – 2.46 awardees). Of the 994 supervisors, 123 were awardees. These 123

¹⁵ Guidance Instructions to Fellowship Host Supervisors. HFSP., 2010

supervisors who were also awardees had 137 awards between them and carried out 194 supervisions. 871 supervisors did not have an award.

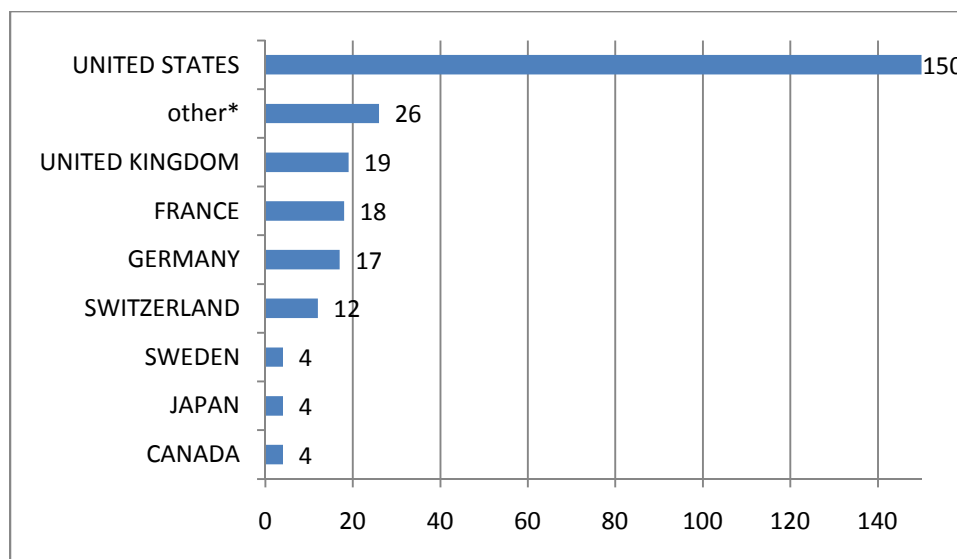
On January 20 2010, Emails to all supervisors were sent out with an accompanying letter from HFSP. A further email was sent on 11 February thanking all those who had participated and with a reminder that the survey would close on 15 February 2010.

The analysis is based on responses from **254 host supervisors**. The response rate of 25.6% is lower than in the other surveys. However, as supervisors are, first, benefiting more indirectly from the fellowship than the awardees themselves and, second, as HFSP is only one of many different sources with which staff is financed in research organisations, the response rate is still very high and certainly high enough to draw some general conclusions.

As for the **gender distribution**, of the 219 respondents who answered the gender question, 184 were male and 35 female, which is 16%, and thus is lower than for the fellowship schemes and the young investigator grant, but higher than for the programme grant (11%).

To start with there are 21 countries represented in the sample. As expected, the sample is strongly biased towards the US, 60 % of all responding hosts are situated in the US, followed by UK with 7,5%, Germany and France (both around 7%) and Switzerland.

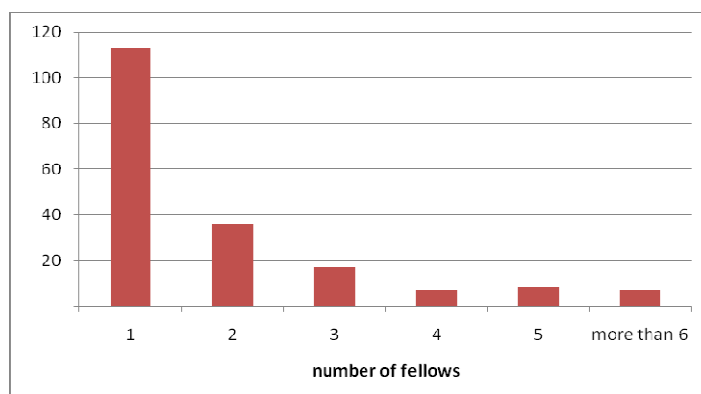
Figure 4: Number of hosts countries (absolute numbers)



* "Other" represent countries with less than four hosts, those are: Argentina, Australia, Austria, Belgium, Brazil, Greece, Hungary, India, Italy, Netherlands, Norway, Singapore, Spain, Taiwan Taipei

Over the time period 1998 -2010, respondents had **in total supervised 356 LTF** of which were 13 CDF. This corresponds to almost 30% of all the 1218 fellows (LTF and CDF, 34% of CDFs) funded in this period. While 60% of respondents have supervised only one fellow, there is a range of respondents who had multiple fellows, in individual cases up to 10 fellows (Figure 5). Given the high level of competition in the HFSP fellowship, this indicates the attractiveness of certain host locations and individuals and the content with the instruments on the side of the hosts, very generally.

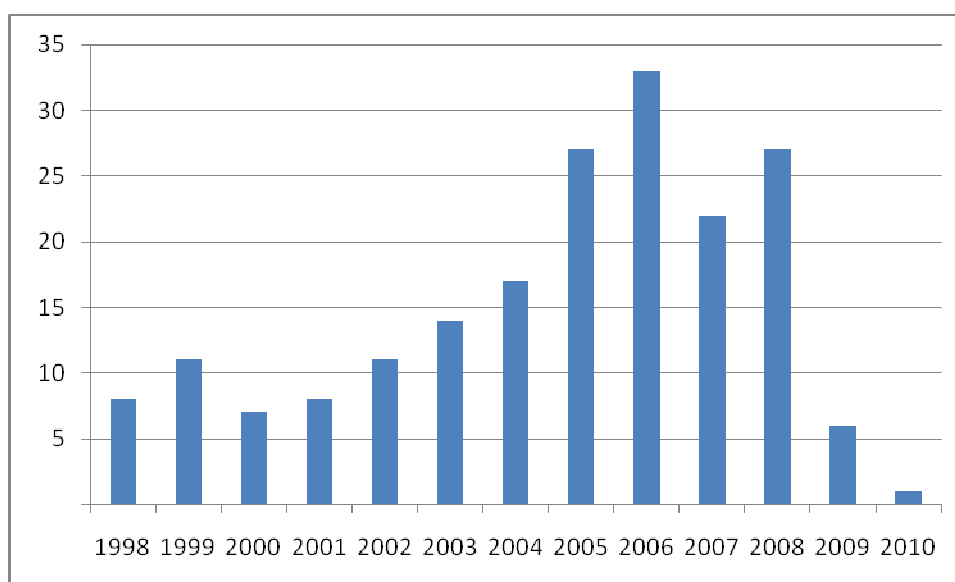
Figure 5 number of fellows supervised by the respondents



Read: e-g., 116 respondents had one fellow supervised

The figures below indicate when the last supervisions of LTF and CDF began in the sample, indicating the coverage through the years (with some bias towards the more recent years as the graph only shows the *last* supervision)

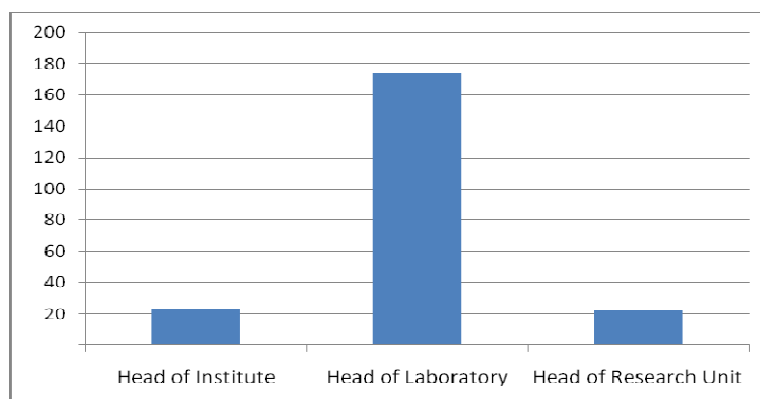
Figure 6: Year when last supervision of LTF/CDF began



3.2.2 Organisational context

Host representatives were asked about their responsibilities in their organisations. The bulk of respondents (68.5%) described themselves as Head of Laboratory, 9.1% as Head of Institute and 8.7% as Head of Research Unit. 35 respondents (13.7%) gave no response. Thus, supervision is by and large not organised through the head of institutes, but through the senior researcher who is directly responsible for functional units.

Figure 7: Responsibilities of host representatives



The survey asked what length of time the laboratory had been established before the arrival of the first HFSP Fellow. In 73.6% of responses the laboratory had been established for more than 5 years and 26.4% for less than 5 years. Finally, the size of organisational units (laboratories) in which the fellows were hosted differed considerably in size. One striking feature is that 44% of the laboratories had no further senior researcher beyond the host himself/herself.

Table 26: Personnel structure within the laboratories

Postdoc			senior researchers		
number of postdocs	count	%	number of senior researchers	count	%
0	1	1	0	75	44
1-8	12	6	1-8	32	19
9-19	42	22	9-19	38	22
20 or more	138	72	20 or more	25	15
N	193		N	170	

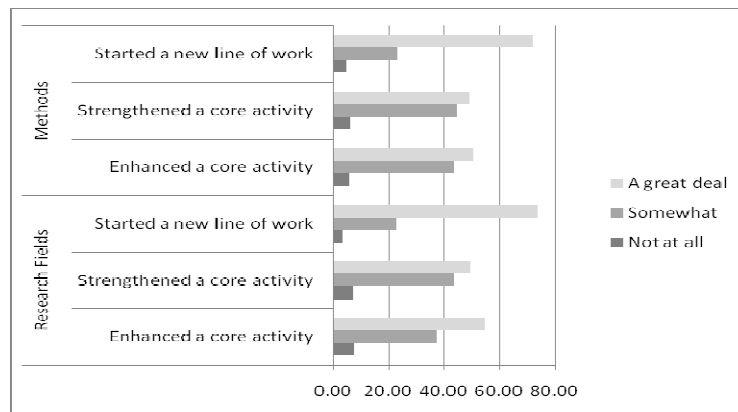
3.2.3 Contribution and Impact of the Fellowship on the Host

One major purpose of the host survey has been to understand what difference the fellowship makes to the host institution. First, and most generally, respondents were asked how strongly the expertise of the Long Term Fellow **impacted on the work** of their laboratory. **62%** of all those responding the question (178) indicated **strong impact**, 36.5% moderate impact, only a tiny fraction say no impact at all. Here, for CDF the figures are interesting (although the overall number of respondents is small), showing that while the same share (60%) of CDF hosts indicates strong impact of the fellow coming from another discipline, 20% say there was no impact at all. The overall number of respondents is very low here, but it is conceivable that for a **small minority** of CDF integration into the new environment could be challenging. This is certainly an issue to observe in the future.

Second, 93 % out of 193 respondents confirmed that the fellow contributed with a new area of research. More specifically, respondents were asked to **categorize** what they felt were the **contributions of fellowship** awardees to the host laboratory in terms of both research fields and research methods. Responses, as the following figure shows, suggested that in both areas significant contributions were to the creation of new lines of work. This is a highly relevant

finding: **73%** of the 190 host respondents to that question indicate that the **fellow started a new line of research** area, **72 %** of the 185 respondents indicated that the **fellow started new activities in terms of methods**. Moreover, the contribution of fellows to the enhancement of core activities and the strengthening of core activities was viewed as strong. The responses indicated that the contribution of the fellow is as strong in the area of research fields as in the area of methods.

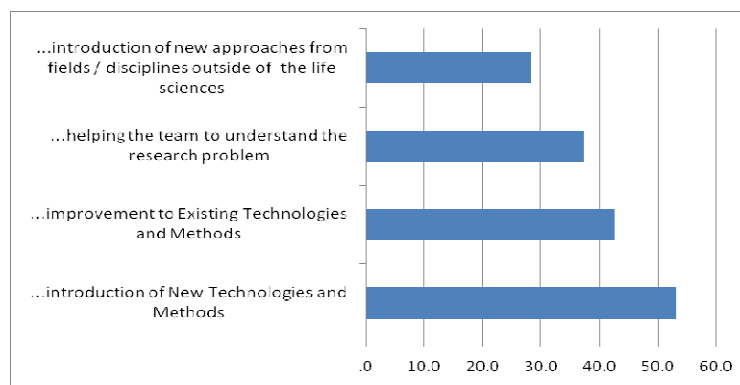
Figure 8: Contribution of fellows regarding research fields and methods*



*in % (N varies between 159 (core activity method) to 190 (new lines of research))

A further differentiation was made as regards the impact of the presence of HFSP fellows in terms of existing and new techniques and methods (Figure 9).

Figure 9: The fellow had impact through* ...



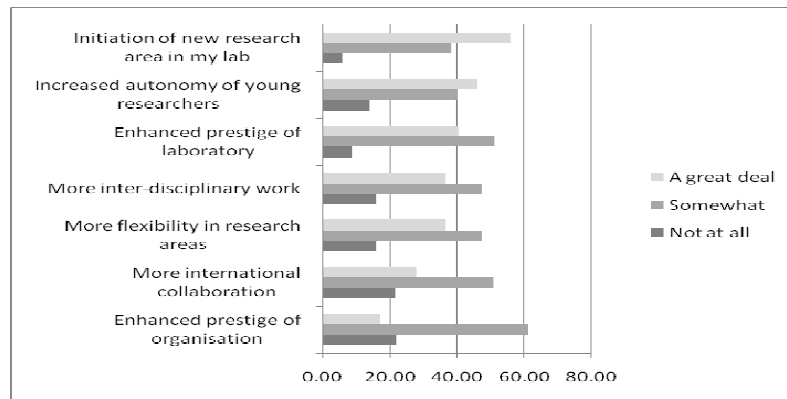
*% of all respondents

The majority of respondents indicated that the most significant types of impact came in the introduction of new technologies and methods and improvements to existing technologies and methods.

The HFSP fellow and the “newness” of the research conducted have serious institutional impact; they make a change for the laboratory beyond the immediate line of research that is funded. Respondents also were asked to consider the impact of the fellowship schemes in terms of flexibility, inter-disciplinarity, collaboration, autonomy and prestige. For more than 40% of respondents, the fellowship contributed a great deal (42%) or somewhat (40%) to **more autonomy** of young researchers in the laboratory more generally. The scheme is thus a catalyst for a change in the way post docs operate in the host labs. Further considerable impact

is indicated in terms of **prestige for the lab** (40% “great deal”, 51% “somewhat”) and to more flexibility in research (37% “great deal”). We also see impact on international collaboration, even if less strong, and finally, some prestige effects on the organisation beyond the lab (Figure 10).

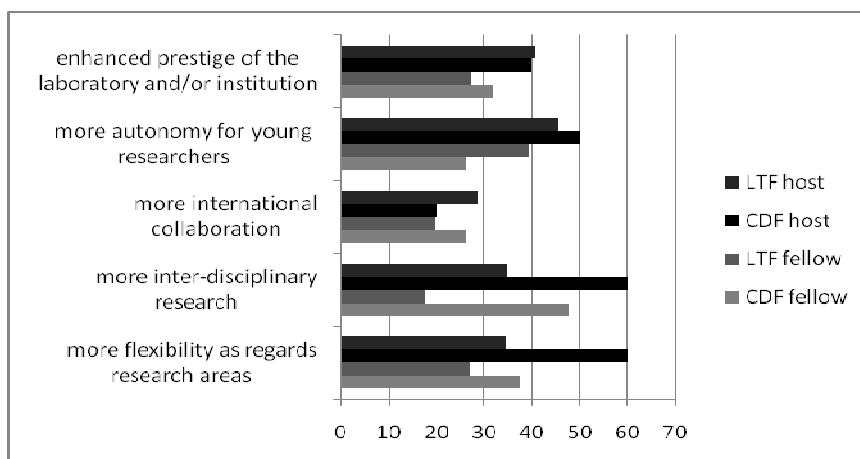
Figure 10 Impact of fellow on the host organisation*



* in % (N= 187 to 188 for the various variables)

Interestingly, the host **supervisors** rate the impact on the host organisation even **higher than the fellows**. Figure 11 shows the share of hosts and fellows that see a major/great deal of impact. It also shows that in terms of inter-disciplinary and flexibility the host fellows (whose number is very low in our sample, though) rate the fellowship very high. For the LTF fellows (more reliable data as numbers are high) the gap between the share of hosts rating “a great deal of” impact and the share of fellows rating “major impact” is actually smallest for enhancement of autonomy, meaning that fellows and hosts have a similar appreciation of the conditions under which the fellows worked.

Figure 11 Impact of fellow on the host organisation: comparison of host and fellow*



* this graph depicts the share of fellows (Table 16, LTF&CDF section above) and the share of hosts that indicate a major change (fellows)/great deal of impact (hosts). Note:

The number of CDF supervisors is still very small in the sample (10 for this question), thus the CDF host results can be interpreted with great care only. Fellows have to be led and supervised. Ideally, the selection process in the HFSP fellowship schemes should ensure that fellows are no burden in times of supervision time they need. Host respondents were asked, whether they had to invest any of their own time in training a new fellow. The majority indicated they needed to spend a low to medium amount of time in training. Only a very small number indicated that no training had been required (Table 27). This is linked to the fact that the vast majority of fellows were able to work entirely independently (Table 28).

Table 27: Amount of time invested in training the new Fellow?

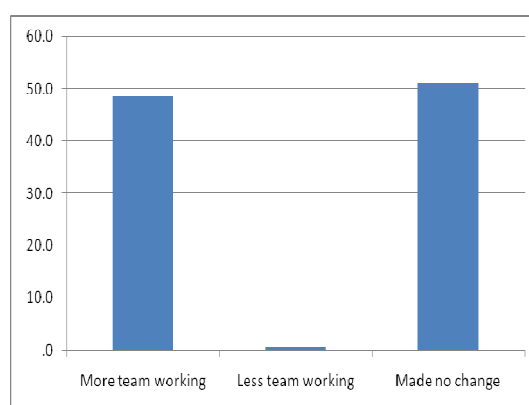
	Responses
None	3.7 %
Low amount	42.9 %
Medium amount	48.1 %
Large amount	5.3 %
N	189

Table 28: Was the fellow able to work independently after a period of acclimatisation?

	Responses
Yes, definitely	89.4 %
Yes, partially	10.1 %
No	.5 %
N	189

New fellows also make a difference in terms of **team working** in existing research units and teams. Asked whether the presence of a fellow impacted on team working, half of those responding felt it had made no change in team working, while more than **48%** felt that the fellow **led to more team working**, only 1 percent thought it led to less team working. The HFSP fellow does not lead to disruptions, if at all fellows lead to more team-working.

Figure 12: Impact of fellows on teamwork*



* in %, N= 186

In areas both of contribution, impact and training requirements, no discernable differences were observed between the LTF and CDF schemes.

3.2.4 Expectation and assessment

Respondents were asked what their expectations of HFSP Fellowships had been in specific areas and how they judged the performance in those areas after the fellowship was finished. The two tables below indicate that there in general are high expectations. It further shows that for all but one areas covered in the survey the share of respondents acknowledging achievements is considerably higher than the share of respondents who expected contributions in those areas. Thus, the fellows exceeded expectations.

The only dimension in which the number of respondents who had expectations were minimally higher than the number of respondents perceived achievements is “advancing our research overall”. However, practically all respondents expected such an advancing, and only very few respondents who did not see achievements here, who were disappointed with the fellow.

The second most widely shared area of expectation was the implementation of new technology, as 72% of respondents expected this to happen. The number and share of respondents acknowledging that this was achieved was far higher than this (85,5%). Further, 60% of respondents had expected that the fellow would contribute to solving specific problems the lab had, and again, a higher number of respondents indicated that this had happened (two thirds). The share of host supervisors that expected that the fellow would seed new international collaboration and new international collaboration is slightly below 50%, but again, the hosts appear to be positively surprised, around 55% of respondents say both things happening through the fellowship (see tables below).

Table 29: Expectation of the HFSP Fellowship and Ex Post Assessment (counts)

	Expectations (i.e. before)		Fulfilled (i.e. after supervision ended)		Differences	
	Yes	No	Yes	No	Yes	No
	<i>Counts of Responses</i>					
New technologies implemented	133	52	153	26	20	26
Specialist presence helps the lab solve a long standing problem	107	75	116	57	9	18
Would advance our research overall	185	1	176	6	-9	-5
Help to seed new international collaborations	78	102	94	76	16	26
Help to seed new interdisciplinary collaborations	80	102	97	76	17	26

Table 30: Expectation of the HFSP Fellowship and Ex Post Assessment (in %)

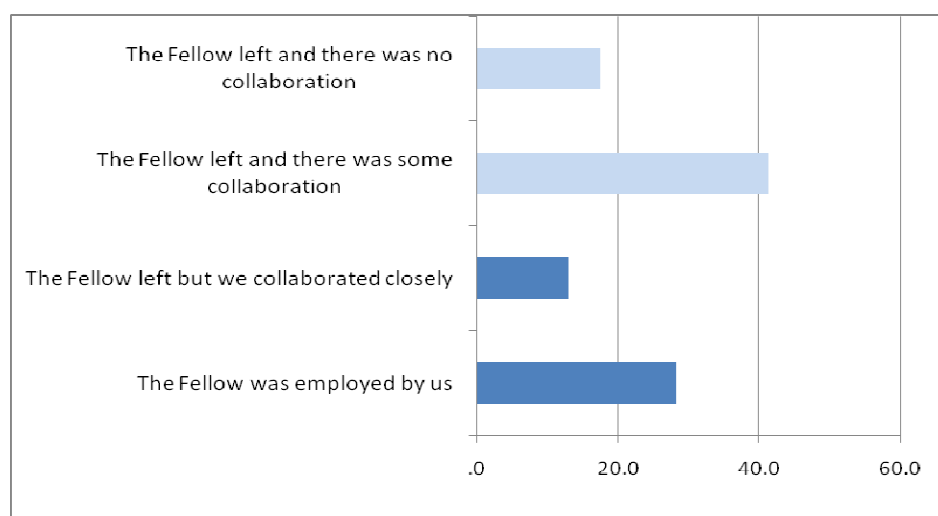
	Expectations (i.e. before)			Fulfilled (i.e. after supervision ended)			Differences
	No	Yes	No	No	Yes	No	Yes
	%		%	%		%	%
New technologies implemented	185	71.9	28.1	179	85.5	14.5	13.6
Specialist presence helps the lab solve a long standing problem	182	58.8	41.2	173	67.1	32.9	8.3
Would advance our research overall	186	99.5	0.5	182	96.7	3.3	-2.8
Help to seed new international collaborations	180	43.3	56.7	170	55.3	44.7	12.0
Help to seed new interdisciplinary collaborations	182	44.0	56.0	173	56.1	43.9	12.1

The findings above lead us to take a closer look as to the persistence of change. One major idea of the HFSPO fellowship schemes is that the effects are persistent, and further lines of research and collaboration emerge. A vast majority of respondents (84%) responded yes to the question of whether after the departure of the supervised fellow any new technologies introduced became a standard feature in their labs. Thus, there is a knowledge and technique build up and transfer as a result of the fellowship scheme.

Host were further asked what happened to the relationship with the fellow once the supervision ended. Out of the 177 that answered the question, for only a minority (17.5%) did the end of the fellowship signify the end of collaboration (Figure 13, Table 31). As we can see from the figure and table below close to 30% of hosts subsequently employed the fellow and in 15% (41%) of cases the fellow left but established close (some) collaboration with the host organisation.

Thus, the fellowship scheme has some significance both for creating positions of fellows in their host labs and in maintaining collaboration, an entire split is the exception.

Figure 13: What happened after the fellowship ended (%)



in %, N=177,

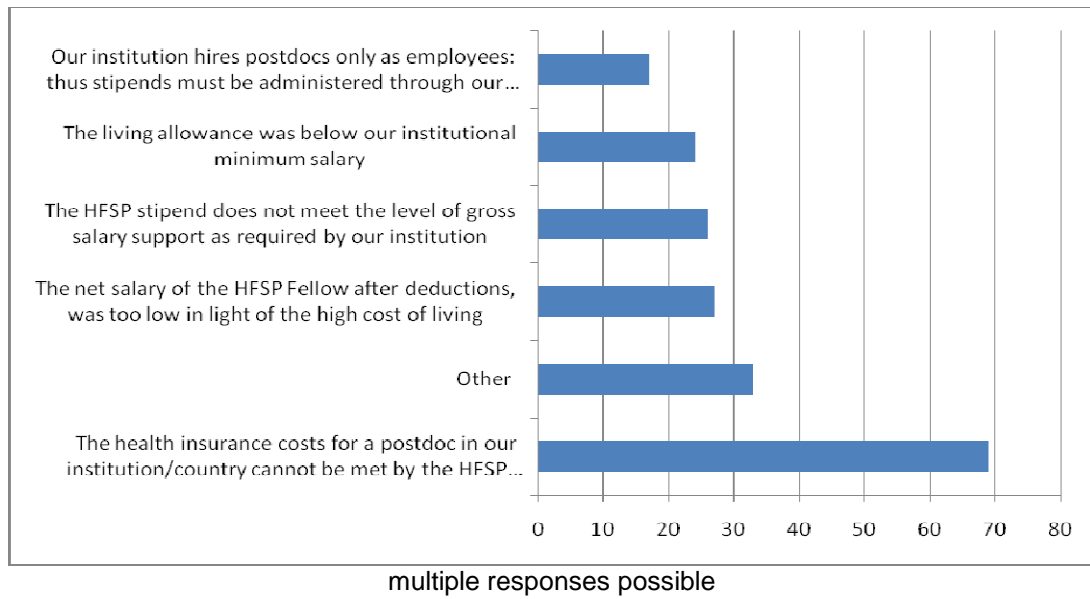
Table 31: What happened after the fellowship ended, counts

	Responses
The Fellow left and there was no collaboration	31
The Fellow left and there was some collaboration	73
The Fellow left but we collaborated closely	23
The Fellow was employed by us	50
Total	177

3.2.5 Funding and Recruitment

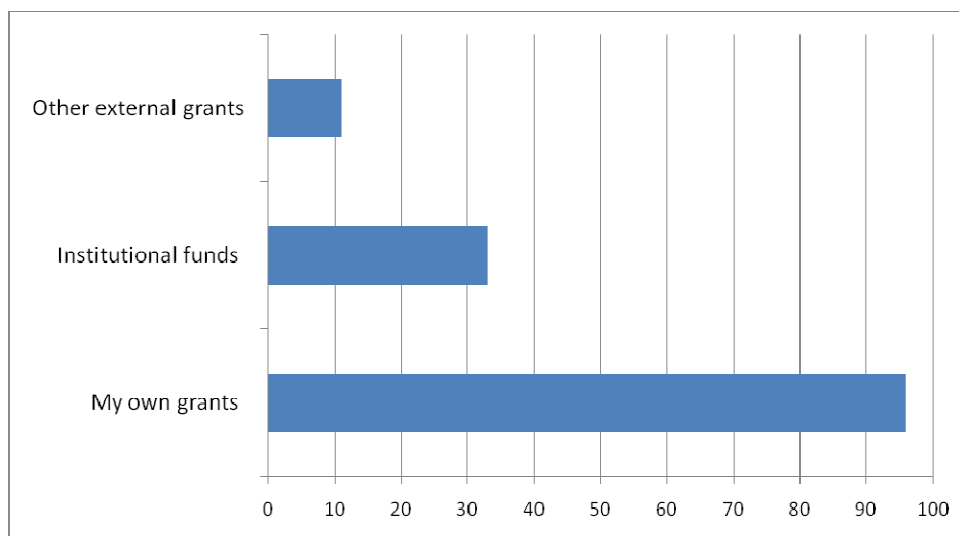
The survey further asked whether or not **additional or supplementary** funding to the HFSP award was required. 189 respondents answered, of whom **65% confirmed that additional funding was provided** to support the HFSP awardee. The table shows the 4 most persistent reasons given. Not surprisingly the requirements of health insurance costs, which are variable across regions, tops the list. The next three reasons for supplementation are indicated by around 25 respondents only (10%), which means that all in all the fellowship covers the living costs and the comparable salary reasonably well. Only a minority of 17 respondents said that the organisation only employs fellow and thus had to put them on their payroll. In the free text category ("other"), the most often mentioned reason was support for "research", indicating mainly infrastructure and equipment needs that needed to be met.

Figure 14: Reasons for additional funding (counts)



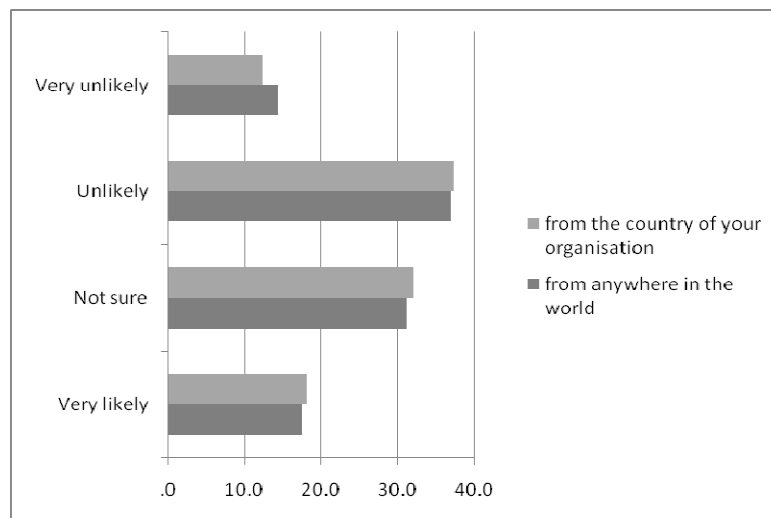
The sources for supplementary funding are mainly the grants of the supervisors, institutional funds are much less common (Figure 15).

Figure 15: Origin of supplementary funding (counts)



Coming back to added value of the HFSP fellowships, a final question is if all those effects that the fellow had on the host have been achieved through finding some other appropriate candidate nationally or globally. Figure 16 shows that **less than 18% indicate that they would have been able to hire a fellow of the same quality**, 30% could not really tell; the rest indicated that it was unlikely or very unlikely that they would have found someone with comparable without the HFSP programme.

Figure 16: Without the HFSP scheme would you have been able to hire a researcher of the same quality as the Fellow (%)...



N=189 (global), 187 (country)

3.2.6 Some country differentiation

As seen in Figure 4 above, the hosts represent a range of countries, with a clear dominance of the USA (60%), and a set of countries that have between 6% and 7.5%, with most countries having less than 2 % which is less than 4 hosts represented. All variables have been tested against country differences. For the reason of clear dominance of the USA and the high number of countries with very few hosts, to depict the analysis across all major variables differentiated for all countries is not sensible. Meaningful results can be obtained in two ways. The first is to group countries, the USA as dominant country vs. the group of countries with medium weight in the sample vs. all countries with a few hosts in the sample only. The latter are countries that are combined in the category “other” in Figure 4 above., they are either slightly less advanced or very small. In the second group, medium sized countries or very attractive ones (Switzerland) are included. These are all the countries that are mentioned in Figure 4 above. A second way is to detect patterns in the analysis of single countries. Only those variables are reported in which there is a statistically significant difference¹⁶ between country groups or a clear idiosyncrasy of a single country.

The significant results in the country group comparison can be summarised as follows:

- the **small country hosts** report significantly **more often** that the fellowship **triggered a more international cooperation** (58.8% saying a great deal vs. 25% in the US group and 24% in the medium sized group of countries), although the expectations of those hosts were lower as regards international collaboration
- the **US hosts** and the **hosts of the smaller countries** report more often efforts in supervising the fellow (61% and 55% say medium to large amount of effort, while the medium sized countries this figure is 35%), and they also more often report that they needed to co-fund the fellow (US 73%, small countries 78% vs. medium sized countries 43%).

¹⁶ Based on a chi-square test.

- for all small country hosts the fellowship led to an introduction of a new technology,, while this is true for 85% US and 77% medium sized country hosts
- **after the fellowship** ended, the **small country hosts** significantly **more often employed** the fellow (35% vs. 25% (medium countries) and 28% (US) and much more often collaborated closely (35% vs. 19% medium sized countries and 7% US)

The analysis at the level of individual medium size countries with 8 to 14 answers (UK, Germany, France and Switzerland) has thrown up some interesting observations. These, however, given the rather low numbers of respondents, should be generalised with caution:

- In **Germany**, the fellows seem to **add less often new dimensions** to the laboratory. Only four out of nine hosts said that the fellow contributed strongly through a new line of work (44%), while in other comparator countries this ratio is very different (in France 8 out of ten, in Switzerland 7 out of 8, in the UK 11 out of 4, in the US 123 out of 169 (73%). Equally, the German hosts less often report that the fellow has added a new line of research (25% vs. 59% of the whole sample). Further, 5 out of 7 (71%) German hosts did not expect any new interdisciplinary collaborations, while for the sample in total the share is 58% (for France it is 40%, with 60% expecting interdisciplinary collaborations).
- The fellowship apparently triggered **less change within host organisations** in **Germany** and in the **UK** than in other countries. In both countries, the share of hosts who report that the fellowship triggered led a great deal more flexibility in research areas is 13% and 15%, while in Switzerland (55%), France (44%) and the US (39) this share is considerably higher. In the UK, 39% of all hosts (5) report no influence at all, by far the highest share. Equally, German and UK hosts report much often than others that the fellowship increased autonomy of researchers (25% in Germany and 39% in the UK saying no, it did not trigger any change, in the total sample this figure is 15%).
- As regards **international collaboration**, the fellowship triggered more change in France (no one reporting that the fellowship did not lead to more international collaboration), but much less in the UK (43% saying the fellowship did not make any difference, indicating the already high level of collaboration in this country)
- Finally, in **Germany only 2 out of 8** hosts reported to have **co-sponsored** the fellow, against, **75% in the US**, the highest share of all countries having more than 4 respondents in the sample. This may add to the attractiveness of the US as host.

3.3 Career Development Awards

3.3.1 Some basic data of the sample

The Career Development Award has been introduced in order to facilitate the transition from post doc to independent scientist. It supports former LTF and CDF awardees to build up a lab in their home country to intensify their international collaborations and experimental endeavours on emerging subjects in the life sciences by drawing on their experience of neighbouring disciplines during their HFSP fellowship. Table 32 shows the demand for CDA which ranges between 41 and 57 in the various years. It has a high success rate compared to other programmes. It provides 300.000 USD over three years.

Table 32: Applications and Awards in the CDA 2005 to 2009

Award year	Number of		Success rate (%)	Female awardees	
	applications	awards		Number	(%)
2003	22	8	36		
2004	41	17	41	5	29
2005	47	18	38	2	11
2006	51	29	57	6	21
2007	48	24	50	6	25
2008	57	21	37	5	24
2009	49	25	51	2	8
TOTAL	315	141	45	26	18

Source: HFSP (2009): Annual Report FY 2008, p. 21

3.3.2 Overall Target and Response of Sample

Our review of Career Development Awards involved the sending of the CDA questionnaire to 112 researchers who had received an award during the last 6 years. Our strategy, agreed with the HFSP, was to ensure that no awardee (from any scheme) was sent more than one email and that all awardees were expected to answer about their latest grant only. Owing to the fact that the information provided to us from which we drew up our list of targets for the CDA questionnaire did not include all the CDA awardees from the current year (2009), a number of awardees from other schemes (LTF/CDF) responded to the instruction to complete the questionnaire that asked about their most recent scheme, which in their cases was the CDA. Consequently, the questionnaire was sent to 112+25 researchers from which 90 responses were provided. We classified the responses as shown below by country of award and below this we compare for all awardees the country in which the PhD was awarded with the country in which the CDA was taken. The table shown below reflects the true population (of all CDA awardees) who have received a CDA, including the new 2009 data that was not used to prepare the email invitation at the launch of the surveys.

Table 33: Country coverage of the CDA sample

ALL AWARDEES		RESPONDING		RESPONSE RATE %
	Frequency		Frequency	
Argentina	3	Argentina	1	33
Australia	1	Australia	1	100
Belgium	4	Belgium	3	75
Brazil	1	Brazil	1	100
Canada	15	Canada	7	47
China, People's Republic	2	China, People's Republic	1	50
Czech Republic	1	Czech Republic	1	100
Denmark	1	Denmark	1	100
Finland	1	Finland	0	0
France	22	France	11	50
Germany	20	Germany	13	65
Greece	1	Greece	1	100
Hungary	1	Hungary	1	100
India	2	India	2	100
Israel	17	Israel	11	65
Italy	4	Italy	4	100
Japan	19	Japan	14	74
Korea, Republic of	2	Korea, Republic of	1	50
Netherlands	7	Netherlands	4	57
Spain	8	Spain	6	75
Sweden	1	Sweden	1	100
Switzerland	3	Switzerland	2	67
UK	1	UK	1	100
USA	4	USA	2	50

The table shown above has been prepared to show how, amongst the CDA awardees from the period, the country in which the award had been taken related to the main nationality of the awardee. **There were 141 award holders of whom 90 have responded, coverage of the known population of 64%.**

3.3.3 Award History Data

The CDA awardees responding to the questionnaire were predominantly from the last five years (responses = 80) with only an 11 responses from the first two years of operation of the scheme.

Table 34 Year of CDA Award

In which year did you receive the CDA?				
	Frequency	Percent	Valid Percent	Cumulative Percent
2003	5	5.5	5.5	5.5
2004	6	6.6	6.6	12.1
2005	11	12.1	12.1	24.2
2006	15	16.5	16.5	40.7
2007	20	22.0	22.0	62.6
2008	14	16.5	16.5	79.1
2009	19	20.9	20.9	100.0
Total	90	100.0	100.0	

3.3.4 Post Award History Data

Of those responding to the questionnaire, **24 had completed their CDA while the remainder were continuing. Of the 24 who finished their CDA, two had completed early, one because they had obtained a permanent/tenure track research position, the other because they had moved to another country and were no longer able to hold a CDA.** Of the 90 respondents, all but two stated that they would continue to work as a researcher. In the following table we categorize the responses to various questions about future work plans of the CDA awardees reported to us.

The following table, Table 35 Post Award Career Intentions, indicates the plans expressed by the respondents of their future employment. The sum of the count of responses might have been expected to be 90 but respondents interpreted the question with some freedom with a small number giving multiple answers (15 answers two options, two answered three options, and two answered four options with the remainder (six) answering no options.

The resulting data confirms that **academic and research careers are the sole preserve and intention of the CDA awardees**, and that the CDA host research institution is most likely to be the home of the awardee on completion of the award, otherwise the home research institution is the alternative. **However, it is five times as likely that the awardee will remain with the CDA award organisation (host) than to go to the original home research institution.**

Table 35 Post Award Career Intentions

Career Movement Post Award	Count
Do not Know Yet	17
Host Research Institution of the CDA	69
Other Research Institutions in Country of CDA Host	6
Original Home Research Institution	12
In research institution of HFSP Fellowship	1
Other Research institution in Country of CDA institution	5
Research Institutions in Third Country	5
For Profit Company in Country of CDA institution	0
In for Profit Company in Third Country	0

3.3.5 Research carried out during the CDA

The additionality of the CDA is not easily established without detailed questioning through interview and the following table only deals with it in a narrow aspect, the more detailed aspects of this issue being dealt with in a subsequent table (Table 37 The Additional Benefit of a CDA). However our question about whether the project would have been carried out without the CDA does attempt to determine a trend. Of those who answered this question (N=89), 52 stated that they would have carried out the research project in any case. To some degree, there is a prior expectation that for respondents who are well-motivated and organised, as we believe CDA holders to be, that they will have formulated plans to carry out work in the event that they did not obtain their first preference funding (i.e. the CDA), and to respond with a yes to this question. Thus, the high number of respondents stating that the work would have gone ahead in any case should not be surprising.

The high number of negative responses to the question suggests that the funding is critical in a large number of instances, and that the HFSP's activities are essential for some significant scientific activity in this field.

Table 36 Would the research project have been done without the CDA

If you had not received this CDA, would you have done the project anyway?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	52	57.1	58.4	58.4
	No	37	40.7	41.6	100.0
	Total	89	97.8	100.0	
Missing	System	1	2.2		
Total		90	100.0		

Additional Benefit of the CDA

Our review questions have sought to establish the extent of the additionality in a number of other aspects in an attempt to determine the improvements in quality that can be attributed to the CDA in terms of the performance of the research.

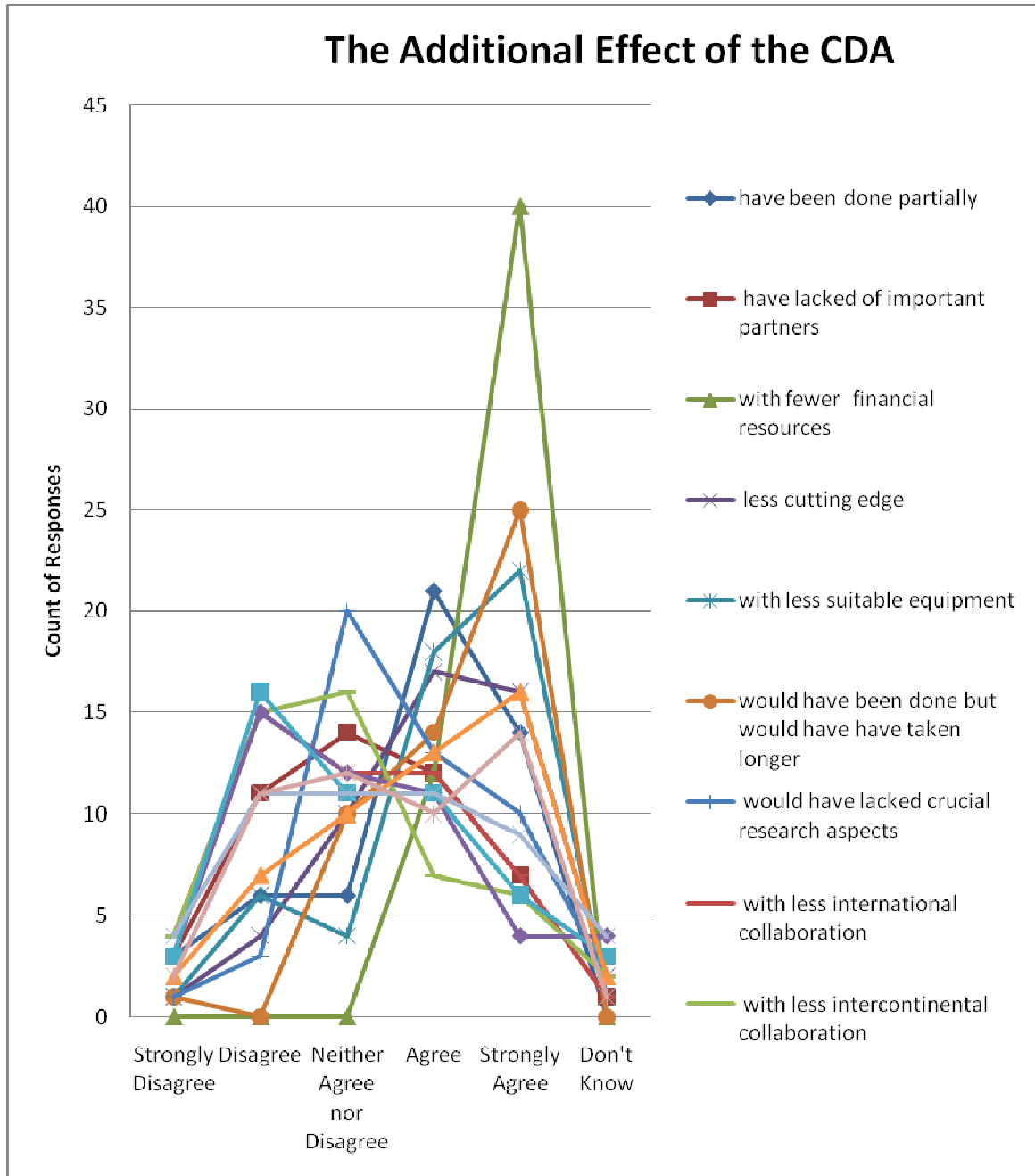
Table 37 The Additional Benefit of a CDA

Without the CDA the work would only...	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Don't know	Total
have been done partially	3	6	6	21	14	0	50
have lacked of important partners	3	11	14	12	7	1	48
with fewer financial resources	0	0	0	12	40	0	52
less cutting edge	1	4	10	17	16	2	50
with less suitable equipment	1	6	4	18	22	1	52
would have been done but would have taken longer	1	0	10	14	25	0	50
would have lacked crucial research aspects	1	3	20	13	10	2	49
with less international collaboration	4	15	12	12	7	1	51
with less intercontinental collaboration	4	15	16	7	6	2	50
with less collaboration with colleagues from other fields within Life Science	3	15	12	11	4	4	49
with less interdisciplinary collaboration	3	16	11	11	6	3	50
with less autonomy	2	7	10	13	16	2	50
with less leadership responsibility	4	11	11	11	9	4	50
without a core team supporting my project	2	11	12	10	14	1	50

The table shown above and the following figure show the key contributions of the CDA upon the conduct of the research. The most significant contribution made by the CDA is financial with other important impacts being that the work would have taken longer had it not been for the CDA award.

Respondents have tended to disagree though about the contribution to interdisciplinarity made by the CDA, believing that this is not greatly assisted by the CDA.

Figure 17 The Additional Effect of the CDA



If Without CDA – Plans for Movement

Respondents were asked to assume that they had not got a CDA and then to imagine what they might then have done. **Double counterfactual approaches can be unreliable; here we note that 22 respondents indicated that they would have moved into the CDA institution in any case. Whether this provides evidence that the CDA is not achieving an objective of returning researchers to home countries is difficult to say on this basis.**

Table 38 Those Who Would Not Have Done the CDA Project – Double Counterfactual

If not Doing the CDA - What Would Have Been Course of Action?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	stayed in the institution I was when I applied for CDA (if different from CDA institute)	6	6.6	16.7	16.7
	moved into the CDA institution anyway	22	24.2	61.1	77.8
	moved elsewhere	7	7.7	19.4	97.2
	had left research altogether and changed careers	1	1.1	2.8	100.0
	Total	36	39.6	100.0	
Missing	System	54	60.4		
Total		90	100.0		

3.3.6 Collaboration Data

Integration

The questionnaire asked how much respondents felt integrated into their host institution, what might be regarded as a precondition for successful research and network building.

As the following table shows Table 39 How Comprehensively Integrated into Research Institution six of the respondents felt poorly or not integrated while around one third of all respondents felt entirely integrated. Further analysis will aim to relate the extent of integration to the publication outputs.

Table 39 How Comprehensively Integrated into Research Institution

Response Type	Observed N
not at all	1
a little	5
partly	12
significantly	40
entirely integrated	31
Total	89

A further question concerned the extent to which awardees collaborated within their institution but did so outside the research team in which they were employed. Table 40 Working outside the Team in the Host Organisation shows that the extent of collaboration within the institution but outside the team was extensive with 28 respondents indicating that they collaborated significantly outside the team. In fact few people restricted their work entirely to their own team with the trend being for awardees to work more broadly.

Table 40 Working outside the Team in the Host Organisation

Working Outside the Team in the Host?	Observed N
not at all	7
a small amount	15
partly	38
significantly	28
Total	88

Collaborating in the Host Organisation

The questionnaire asked respondents to indicate how well they were able to collaborate within the host organisation. **While a small number did not collaborate** (either not at all or only a little) and some only collaborated partly, **61 out of the sample of 88 were able to collaborate significantly or very significantly (69%)**.

Table 41 Collaborating in the Host Organisation

Collaborating in the Host Organisation	Observed N
not at all	2
a little	8
partly	17
significantly	49
very significantly	12
Total	88

Team Characteristics and Processes

Respondents were further asked about the characteristics of the teams in which they worked during their award. Questions were asked on the following issues – whether the awardee had been responsible for a team, whether the members of the team had been from the life sciences or more exclusively or whether they had come from outside the life sciences, whether the composition of skills within the team had been appropriate for the work the awardee had undertaken, and whether the team could be led in the way which the awardee thought appropriate.

- Those who led a team in their CDA were the vast majority of award holders, according to the survey – of 88 responses, 82 had led a team, and only six had not.
- 56 awardees had been in teams which were exclusively within the life sciences, while 28 had led teams that had included researchers from outside the life sciences.

The following table shows general satisfaction with the composition of the teams that CDAs worked in. A significant group though either disagreed (5) or neither disagreed or agreed (21).

Table 42 Composition of Team and Appropriateness for Research of CDA Awardee

The composition and skills of the team was exactly appropriate for my research					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	5.5	6.1	6.1
	Neither Agree nor Disagree	13	14.3	15.9	22.0
	Agree	49	53.8	59.8	81.7
	Strongly Agree	15	16.5	18.3	100.0
	Total	82	90.1	100.0	
Missing	System	8	9.9		
Total		90	100.0		

Only a small number of awardees believed that they were not able to lead the team as they wished.

The interviewees clearly confirmed this finding, saying that the additional money the CDA provides allows doing the decisive step beyond simply covering the salary, enabling to shape his / her context and build a profile independent from the profile of the head of the group. However, one qualification was made: national contexts in terms of autonomy and leadership of young researchers are different. In one case, it took one CDA quite some time to establish his leadership role vis-à-vis the leaders of the research organisation who were not used to the high level of autonomy. While the awardee succeeded in establishing his role and autonomy, he suggested to better signal to the host organisations what the CDA is about and how the awardee should have autonomy over his award. In one other case, however, the leadership and autonomy was entirely established and the CDA did “exactly what it should do”.

Table 43 Leadership Issues

Could lead the team entirely as you thought it to be necessary for the project?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.1	1.2	1.2
	Disagree	3	3.3	3.7	4.9
	Neither Agree nor Disagree	10	11.0	12.2	17.1
	Agree	45	49.5	54.9	72.0
	Strongly Agree	23	25.3	28.0	100.0
Total		82	90.1	100.0	
Missing	System	8	9.9		
Total		90	100.0		

The following table indicates that CDAs are generally taking their first leadership role when they take up their CDA.

Table 44 First Leadership Responsibility?

Was this your first leadership responsibility?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	77	84.6	92.8	92.8
	No	6	6.6	7.2	100.0
	Total	83	91.2	100.0	
Missing	System	7	8.8		
Total		90	100.0		

The questionnaire enquired into the issue of collaboration of the host project beyond the host organisation. **Clearly, the majority of projects involve collaboration beyond the host, but a significant number do not (27).**

Table 45 Collaboration beyond Host for CDA?

Does/did your CDA project involve collaboration beyond your host institution?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	60	65.9	69.0	69.0
	No	27	29.7	31.0	100.0
	Total	87	95.6	100.0	
Missing	System	3	4.4		
Total		90	100.0		

When there was collaboration, most of it was international in scope, **56 out of the 60 international collaborations were international, and, from the table shown further down, much of this was new** - Table 47.

Table 46 Extent of International Collaboration

		Frequency	Percent	Valid Percent
Valid	Yes	56	61.5	93.3
	No	4	4.4	6.7
	Total	60	65.9	100.0
Missing	System	30	34.1	
Total		90	100.0	

Table 47 Extent of New International Collaboration

If yes, Did this involve new international collaboration(s)?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	44	48.4	78.6	78.6
	No, but would have been desirable	3	3.3	5.4	83.9
	No, there was no need	9	9.9	16.1	100.0
	Total	56	61.5	100.0	
Missing	System	34	38.5		
Total		90	100.0		

Of the international collaboration that took place as a result of the CDA, a significant amount took place an intercontinental form. As the table below shows, Table 48, 46 of the collaborations were intercontinental. **Thus of the 56 instances of international collaboration, 46 (82%) had an international dimension.**

Table 48 Extent of Intercontinental Collaboration

Did this involve intercontinental collaboration in your research project?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	46	50.5	82.1	82.1
	No	10	11.0	17.9	100.0
	Total	56	61.5	100.0	
Missing	System	34	38.5		
Total		90	100.0		

Collaboration Partners

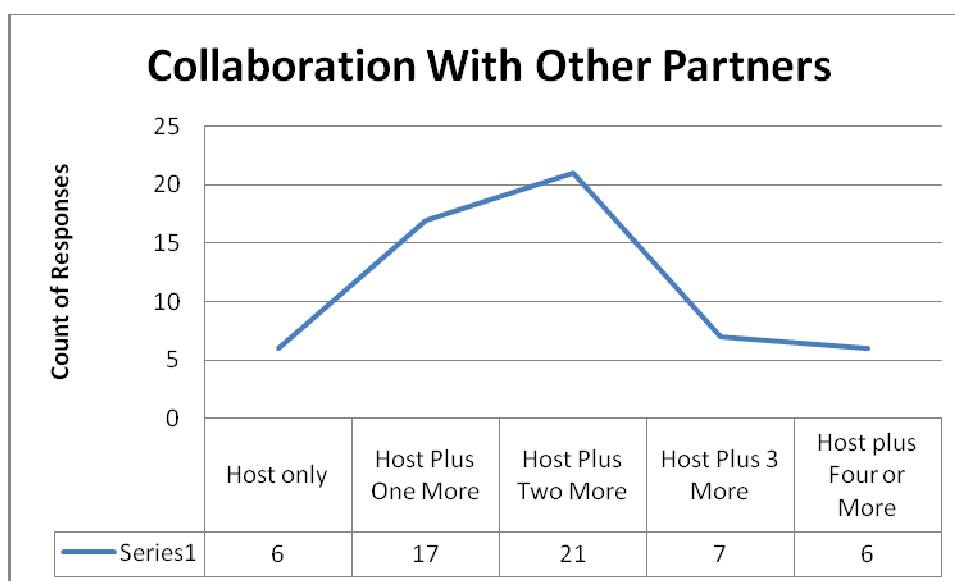
The questionnaire examined the number of collaboration partners involved in the work of the project. The responses shown below indicate that the host plus two or more parties were the commonest type of collaboration.

Table 49 Institutions involved in the CDA Research Project

How many institutions are/were involved in your CDA research project?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Only the host institution	6	6.6	10.5	10.5
	One more	17	18.7	29.8	40.4
	Two more	21	23.1	36.8	77.2
	Three more	7	7.7	12.3	89.5
	More than three	6	6.6	10.5	100.0
	Total	57	62.6	100.0	
Missing	System	33	37.4		
Total		90	100.0		

The figure shown below indicates this clustering of institutional partners.

Figure 18 Collaboration with Other Partners – Count of Responses by Number of Partners



Involvement of Other Countries

The data shown below shows that the number of countries involved in collaboration varies with up to four countries noted (the maximum value). However, there were a large number of missing values here. Coupled with the data from the previous table, it is likely that the most common form of collaboration with other partners, which includes 21 cases, corresponds to the case of 2 other countries shown below as partner countries.

Table 50 Other Countries Involved in Collaboration

Institutions from how many countries were involved (including the country of the host institution)?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	7	7.7	12.5	12.5
	2	26	28.6	46.4	58.9
	3	13	14.3	23.2	82.1
	4	10	11.0	17.9	100.0
	Total	56	61.5	100.0	
Missing	System	34	38.5		
Total		90	100.0		

Newness of Collaboration

Just over half of the respondents were using the CDA to collaborate with those with whom they collaborated previously. It is not easy to determine what the ideal result should be in this particular case: if all partners were existing, the novelty of the work done might be in question; thus it would seem desirable to have some mixture of responses with some respondents noting that they engaged with new organisations. **The answer of 30 respondents that they did not engage with previous partners suggests that a substantial share of the work undertaken is new.**

Table 51 Extent of Previous Collaboration

If there was collaboration within the CDA did it involve labs with whom you collaborat(ed) prior to your award?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	36	39.6	54.5	54.5
	No	30	33.0	45.5	100.0
	Total	66	72.5	100.0	
Missing	System	24	27.5		
Total		90	100.0		

Post Award Collaboration

Those respondents who had finished their CDA were asked if they had continued to collaborate with the international colleagues with whom they engaged during their CDA. The majority of awardees are remaining engaged with their colleagues from their CDA supported work, although any decline in the rate of collaboration over time has yet to be fully assessed.

Table 52 Post Award Collaboration with CDA Collaborators Excluding Host Organisation

If your award has already finished-Do you currently still collaborate with international colleagues you engaged with during your CDA (other than the host institution)?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	21	23.1	84.0	84.0
	No	4	4.4	16.0	100.0
	Total	25	27.5	100.0	
Missing	System	65	72.5		
Total		90	100.0		

Longer Term Post Award Collaboration Perspective

Our questionnaire has enabled us to review the post award collaborations made by CDA awardees and to examine these activities over time. In the following table (Table 54) the count of responses shows that even when CDAs have been finished for some time, there is a chance that collaborations between awardees and previous (i.e. within CDA collaborators is possible). It is likely that the extent of collaboration is affected by two opposing mechanisms and that is why the number of collaborations does not simply decline with time from the end of the award. **These two mechanisms are likely to be one the one hand a natural decay process which reduces the relevance of previous collaborators to current work; but on the other hand, an opposing and alternative process which, through the emergence of opportunities for further collaboration through time, makes it possible to revive links with previous collaborators.**

Table 53 Extent of Collaboration with CDA Partners Excluding Host by Year of End of Fellowship

For those who have finished their CDA: Do you currently still collaborate with international colleagues you engaged with during your CDA (other than the host institution)?				
		Yes	No	Total
When did you finish your HFSP fellowship?	2003	5	2	7
	2004	6	0	6
	2005	3	1	4
	2006	2	0	2
	2007	2	0	2
	2008	1	1	2
	2009	2	0	2
	Total	21	4	25

The following table indicates that the majority 23 from 27 (85%) have remained with their CDA host.

Table 54 Action Following end of CDA

If your award has already finished-Have you left your host CDA institution?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	4	4.4	14.8	14.8
	No	23	25.3	85.2	100.0
	Total	27	29.7	100.0	
Missing	System	63	70.3		
Total		90	100.0		

3.3.7 Change of Research Fields

An important aspect of research work is discipline change and this occurs amongst high level scholars and is the objective of the Cross Disciplinary Fellowship of the HFSP. To investigate the extent of discipline change within the CDA holders, questions were asked about discipline change previous to the CDA, to what extent discipline change occurred during the CDA and whether there had been reversion (going back to the previous discipline).

CDA holders were asked to what extent their work had led to a change in their core area within the life sciences. **Of the 62 respondents who indicated that they had changed their discipline, 16 reported that this change had occurred during the CDA period.** It would be unwise to attribute all of this effect to the CDA, but there could be some relationship between the two, with the CDA providing further opportunities for scientists to explore areas where they had not worked previously, requiring them to change discipline. CDA work might encourage a change to discipline however during the course of the award.

Table 55 Change of Core Area within Life Sciences during Career

Have you ever in your career switched your core area within the Life Sciences?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	62	68.1	71.3	71.3
	No	25	27.5	28.7	100.0
	Total	87	95.6	100.0	
Missing	System	3	4.4		
Total		90	100.0		

Table 56 Was the CDA When the Change Occurred?

Did you change your major area within the Life Sciences when starting the CDA?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	16	17.6	18.4	18.4
	No	71	78.0	81.6	100.0
	Total	87	95.6	100.0	
Missing	System	3	4.4		
Total		90	100.0		

Reversion is also an aspect of discipline change, where a researcher returns to a field in which they had previously worked. **Responses obtained by our questionnaire suggest that discipline change is small: of the 16 respondents giving a positive answer to the question of discipline change within the CDA, four respondents indicated that they were reverting.**

Assuming CDA holders to be comparable to non-CDA holders, of the 62 researchers who claimed to have changed core area, one quarter (4/16) will be reverting to their original discipline.

Table 57 Reversion – Changing Back to a Previous Field

If yes; did this mean going back to an area you worked in before you had switched previously?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	4	4.4	26.7	26.7
	No	10	11.0	66.7	93.3
	NA	1	1.1	6.7	100.0
	Total	15	16.5	100.0	
Missing	System	75	83.5		
Total		90	100.0		

3.3.8 Changes in the Host Institution of the CDA

This is an important section of the review at, as indicated in the proposal document, and as a result of further discussion with the HFSP Secretariat, we will be carrying out a further survey to investigate this aspect of the award in relation to the CDF and the LTF. This questionnaire was limited in its examination of this aspect however and we report simply whether the CDA

allowed work that had not been previously carried out at the host institution and what the changes to the host and the home institution arose as a result of the award.

3.3.9 Benefits of the CDA

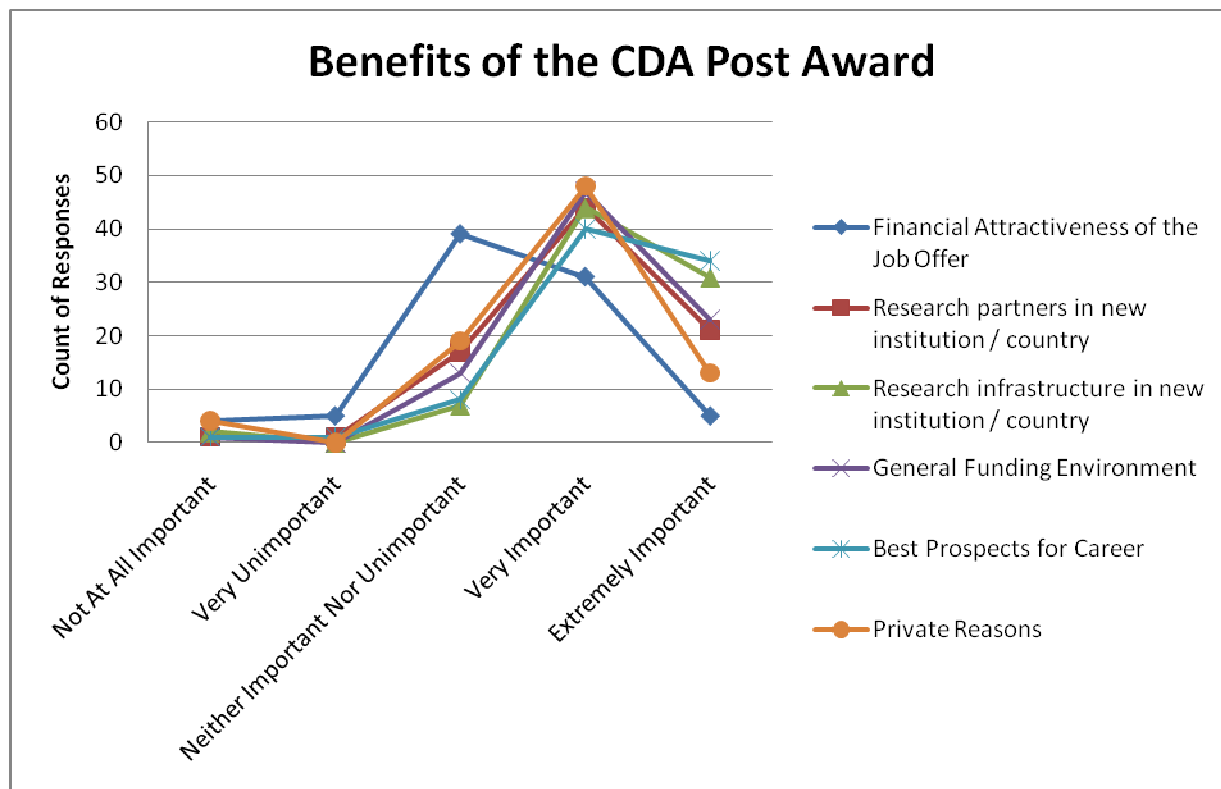
Respondents indicated in response to questions about the benefits of the CDA what had been the attractiveness of the award and how it had affected them in various matters of interest. These key issues are listed down the left hand side of the table and the number of responses (N=84) were spread across certain measures ranging from not at all important to extremely important. The figure which follows the table, Figure 19 Benefits of the CDA, shows that most profiles (distributions of responses) are the same for all key issues with one exception, which is the financial attractiveness of the offer.

CDA awardees appear, on the basis of the responses given, to be less influenced by the financial attractiveness of offers which are made to them when they plan their next step beyond the CDA.

Table 58 Benefits of the CDA Post Award

	Not At All Important	Very Unimportant	Neither Important Nor Unimportant	Very Important	Extremely Important	Total
Financial Attractiveness of the Job Offer	4	5	39	31	5	84
Research partners in new institution / country	1	1	17	44	21	84
Research infrastructure in new institution / country	2	0	7	44	31	84
General Funding Environment	1	0	13	47	23	84
Best Prospects for Career	1	1	8	40	34	84
Private Reasons	4	0	19	48	13	84

Figure 19 Benefits of the CDA Post Award



Effect on Career Development

The following table shows the extent to which CDA awardees believed that the CDA award had a positive impact upon their career. The belief is very strong, amongst most awardees that the award affects them positively and significantly.

Table 59 Effect of CDA on Career Development

The CDA had a crucial positive effect on my career development?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.1	1.2	1.2
	Disagree	1	1.1	1.2	2.4
	Neither Agree nor Disagree	2	2.2	2.4	4.8
	Agree	24	26.4	28.9	33.7
	Strongly Agree	55	60.4	66.3	100.0
	Total	83	91.2	100.0	
Missing	System	7	8.8		
	Total	90	100.0		

Country from Which Job Offers Arise

The questionnaire also attempted to review the countries from which job offers came and although the number of offers was small, it was clear that awardees were receiving some. The country from which the largest number of offers came was Japan (6), while organisations in the USA (3) and France (3) both made offers.

Table 60 Countries from Which Job Offers Came

Did you receive a job offer during the CDA from another institute/University – Which Country Was Offer Made From?	
Australia	1
Canada	2
France	3
Greece	1
Italy	1
Japan	6
Spain	3
Switzerland	1
USA	3

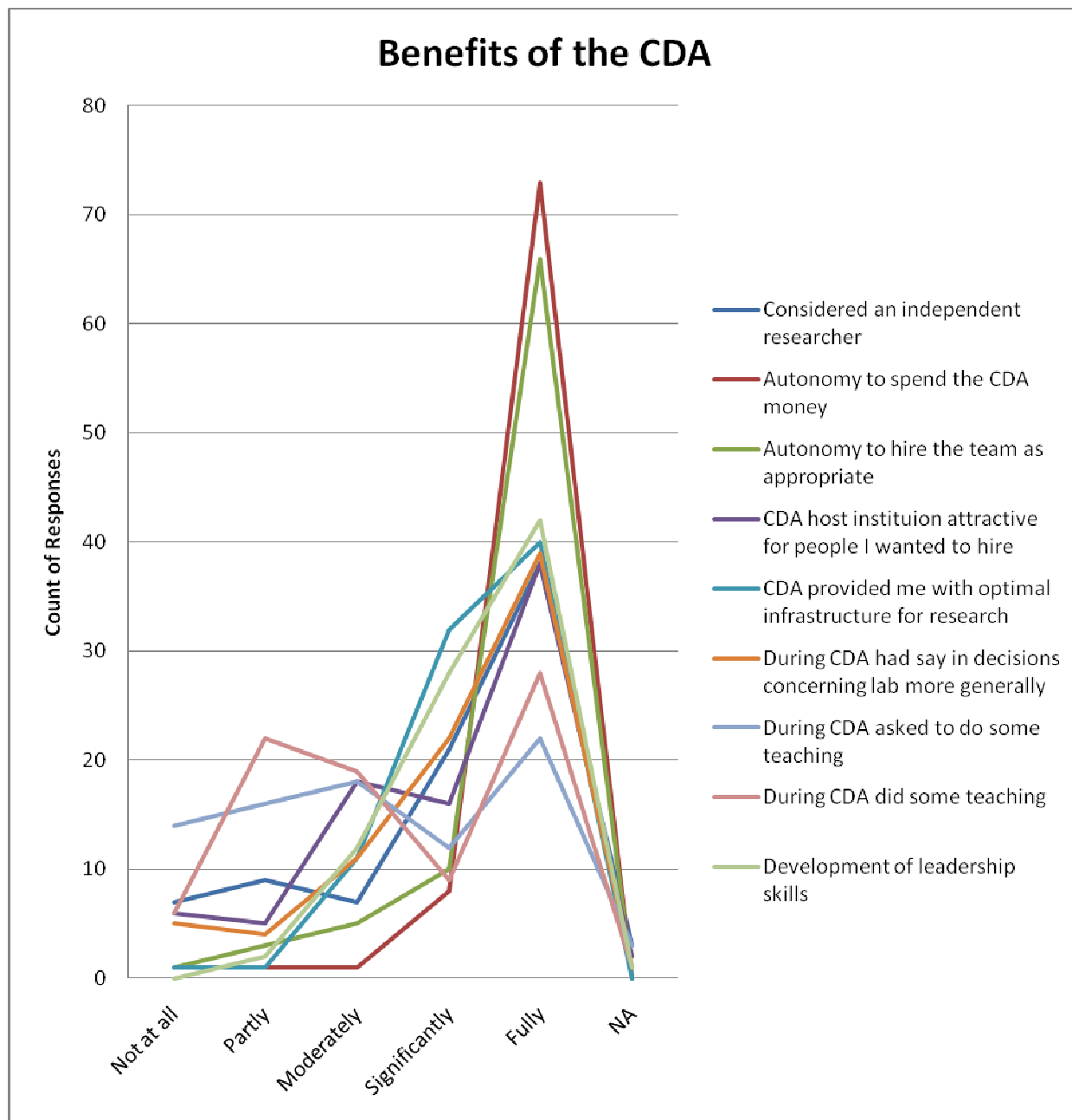
Benefits of CDA

We further examined through questions about what the CDA had provided the benefits of the award and the responses from (N=84/85) respondents are shown in the following table, and, so as to identify variations between the aspects on which the respondents commented, the information is graphically present in Figure 20 Benefits of CDA

Table 61 Benefits of CDA

	NOT AT ALL	PARTLY	MODERATELY	SIGNIFICANTLY	FULLY	NA	TOTAL
Considered an independent researcher	7	9	7	21	38	3	85
Autonomy to spend the CDA money	1	1	1	8	73	0	84
Autonomy to hire the team as appropriate	1	3	5	10	66	0	85
CDA host institution attractive for people I wanted to hire	6	5	18	16	38	2	85
CDA provided me with optimal infrastructure for research	1	1	11	32	40	0	85
During CDA had say in decisions concerning lab more generally	5	4	11	22	39	1	82
During CDA asked to do some teaching	14	16	18	12	22	3	85
During CDA did some teaching	6	22	19	9	28	1	85
Development of leadership skills	0	2	12	28	42	1	85

Figure 20 Benefits of CDA



The table shown above, Figure 20 Benefits of CDA, indicates some significant variability in terms of the factors but there is a clear general trend of significant and full satisfaction with the CDA and the conditions it provides under which research is carried out. There are some factors which though show more satisfaction, these being identified in the peak of the graph under the “fully” satisfied measure. Thus, the CDA provides to a very significant degree complete autonomy to spend the money of the award, and the autonomy to hire the team.

Further Grant Getting During the CDA

While it might be expected that during a CDA, there would be no further need for grants / awards from other organisations, it would appear that CDA awardees do obtain further grants and awards during their CDA. Interviews confirm that awardees are using their CDA “as leverage”, allowing them on the basis of the prestige of the award they already have to obtain further funding from other sources. Whether this represents an instance of the “Matthew effect” has very little to do with the HFSP and would be related to the grant award processes of other funding agencies.

Table 62 Whether Allowed to Obtain Further Grants during CDA

Were you allowed to get further grants during the CDA?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	79	86.8	96.3	96.3
	No	3	3.3	3.7	100.0
	Total	82	90.1	100.0	
Missing	System	8	9.9		
Total		90	100.0		

Our next table tends to confirm the view that there may be some “leverage” effect, although this might vary from country to country and from scheme to scheme. Further analysis of this may reveal some significant findings, but it is only likely to be on the basis of a relatively small number of cases. Of those who applied for a grant and said that they had obtained one (a slight inconsistency with the previous question result resulting from a missing response) we investigated the role of the CDA in obtaining the subsequent grant.

Table 63 Role of CDA in Getting Further Grants

Was the CDA instrumental in getting further grants during the CDA?							
If yes: Was the CDA instrumental in getting further grants during the CDA?							
	Not at all	Partly	Moderately	Significantly	Fully	NA	Total
	12	12	14	20	8	14	80

Problems Finding Grants Once Finished

Table 64 Difficulties Finding Grants after the CDA Completed

Did you have problems in finding grants after the CDA had finished?	
	Observed N
Not at all	14
Barely	9
In a number of occasions	14
Frequently	7
Very much so	1
Total	45

The table shown above, Table 64 Difficulties Finding Grants after the CDA Completed, indicates that CDA awardees do encounter some difficulties with obtaining further grants beyond their award, **but that this difficulty is not significant. In fact 23 from 45 of the respondents reported either no problem getting further grants or only slight problems, only eight reported significant problems.**

3.3.10 CDA Quality

Duration of the Award

Of our 90 respondents, around half believed that the duration of the award was sufficient to carry out the work that was planned and expected; but the other half of the respondents believed that the period was insufficiently long. To the extent that the duration of the award compromised and restricted the nature, scope and outcomes, it is difficult to say at this stage, and more detailed examination of this issue may be a priority at a later date.

The following table indicates the extent to which respondents believed that the award met the costs of the work they undertook. Here there is a genuine split in the responses with 41 respondents believing that the costs were to some extent not covered, while only 31 believed that the costs were met.

Two interviews confirm that split. One interviewee, who was generally extremely satisfied with the CDA, claimed that it falls short of really building a real group. While acknowledging that the CDA cannot match the ERC grant given the overall budget, she still raised the idea of having fewer numbers of CDA but with a better funding for the individual award. A second interview did not see this to be a good way to go, as the already limited outreach of the CDA would be further limited.

Table 65 Coverage of Necessary Costs

Response	Observed N
Strongly Disagree	8
Disagree	33
Neither Agree nor Disagree	14
Agree	23
Strongly Agree	3
Total	81

Aims, Purposes and Achievements of the Annual Meetings

Attendance at HFSP meetings was also investigated and respondents indicated support for the meetings, with 69 attending at last one and 39 attending more than once. A country by country analysis of this data might possibly identify if location of the meetings is a restriction.

Table 66 Attendance at HFSP Annual Meetings

	Response	Frequency	Percent
Valid	Yes, once	30	33.0
	Yes, more than once	39	42.9
	No	16	17.6
	Total	85	93.4
Missing	System	5	6.6
Total		90	100.0

The purposes and opportunities presented by annual meeting attendance were then reviewed and on the basis our analysis, we note the following:

In relation to the creation of new networks, the meetings are important with 70 of the 75 respondents who gave answers indicating that they found the meetings important very important or extremely important in making new networks and contact. This is perhaps surprising, given that those who have received a CDA will already have some high level scientific expertise through at least having possessed an earlier HFSP award.

In relation to issues of maintaining scientific networks, the view of respondents was very similar, although a slight change of emphasis can be seen here with the creation of new networks being held to be more important than the creation of new networks.

Respondents were also asked about their views of the role of the annual meetings in terms of promoting the HFSP and enhancing the visibility of its work. Again, the pattern of responses followed that of the answers to the questions about the role of the meetings in networking: respondents strongly believed that the meetings were instrumental in the promotion of the HFSP.

We asked in our questionnaire about how much the researchers felt that they were part of the HFSP community of researchers during their award. **The 84 responses we had to this question clearly showed support for the view that researchers felt part of a community, although around one quarter did not feel that they were part of the community at all or were slightly part of this community.** Whether this proportion is too high is difficult to assess; researchers sometimes value their independence, even within a grant scheme. Comparison between the different fellowship awards in relation to this question would appear relevant and could also be reviewed on an annual basis.

Learning about the HFSP

Respondents were asked about how they had come across information about the HFSP. The most important source was which was referred to twice as often as the next most important source was colleagues and advisors in one's own institution (67 respondents from the sample of 90).

Forms of advice which did not rate highly in terms of bringing the attention of the HFSP organisation to the notice of these awardees were call for applications in journals and presentations by HFSP staff. More important were existing fellows and grant holders (33) and the HFSP web site (33). Of little importance was the call for applications mediated through domestic institutions.

Information Sources

The questionnaire asked respondents to identify the sources of information HFSP had provided for them, the options being web site, email, and annual reports and the respondents were asked indicate their level of satisfaction with these sources.

Alumni Network

The questionnaire asked to if respondents would be prepared to join an international network of alumni. Of the 84 usable responses here, 2 were that they would not be interested while 23 said they were partly interested and 59 said they would be clearly interested. Thus, 97% said that they would be interested so some degree (some more than others) suggesting that the proposal is worth exploring.

3.3.11 Comparable Programmes

The questionnaire sought to make comparisons with other programmes operated by other funding agencies.

At this stage, we name the other programmes that awardees had or wished to give information about rather than carrying out a specific rating of other programmes, a step which could be carried out but which would not be especially reliable as we would not have large amounts of data about each scheme. The schemes that CDA awardees mentioned were as follows:

Table 67 Comparator Schemes Indicated by Respondents

Anr Young Researcher Grant
Avenir Programme From Inserm, Erc
Bernstein Network Of Computational Neuroscience Germany
Burroughs Welcome (USA)
Canadian Institutes Of Health Research
Chinese Academy Sciences Hundred Talent Program
Danish National Research Council (Small/Large Research Grant Scheme)
Dfg Emmy Noether
Embo Young Investigators
Embo,
Emmy Noether Program (Dfg),
Eu-Fp7
European Research Council
European Research Council Starting Grants
Fondazione Telethon (Italy),
Harvard Armenise Foundation; Telethon Foundation (Italy); Ambizione Snf
Hhmi
Howard Hughes Medical Institute
Inserm Avenir
Isf
Israel Science Foundation, Embo-Fp Reintegration Specific Cancer Genetics Funds, Isearl German Foundation
Israeli Science Foundation Morasha Grants For Starting Scientists, Erc Starting Grants
JspS Fund (Sakigake Or Grant A For Young Investigators)
JspS Prest Grant, Japan
Jst, Presto
Legacy, Israel Science Foundation, The Cda Of Nsf

Marie Curie Fellowship
Marie Curie Reintegration
Morasha - A National (Israel)
National Science Foundation Of The United States
Nih
Nih R21
Presto From Japan Science And Technology Agency (National)
Swedish Foundation For Strategic Research
The French Atip/Avenir And Anr, The Erc-Starting Grant
The Wellcome Trust Senior Research Fellowship Program
Wellcome Trust

Below we provide a summary table of the responses given about the CDA and the HFSP as an organisation in comparison with those with whom the respondents are familiar. Table 68 Comparative Performances – HFSP and Other Schemes, shows that in respect of the following characteristics or dimensions of the award (the CDA), the following are considered to be strong points of the HFSP offering: enabling inter-continental collaboration; allowing entry to a field without prior reputation; enabling cross-disciplinary collaboration; allowing the taking of high risks; linking to global excellence.

However, there are some other schemes which apparently are more satisfactory according to the respondents, although we do not know whether the respondents are speaking from the experience of having one (or more) of these awards. The aspects in which comparator schemes might perform better are as follows: allowing one to lead a Team; establishing ones as a lead researcher; and the duration of the award.

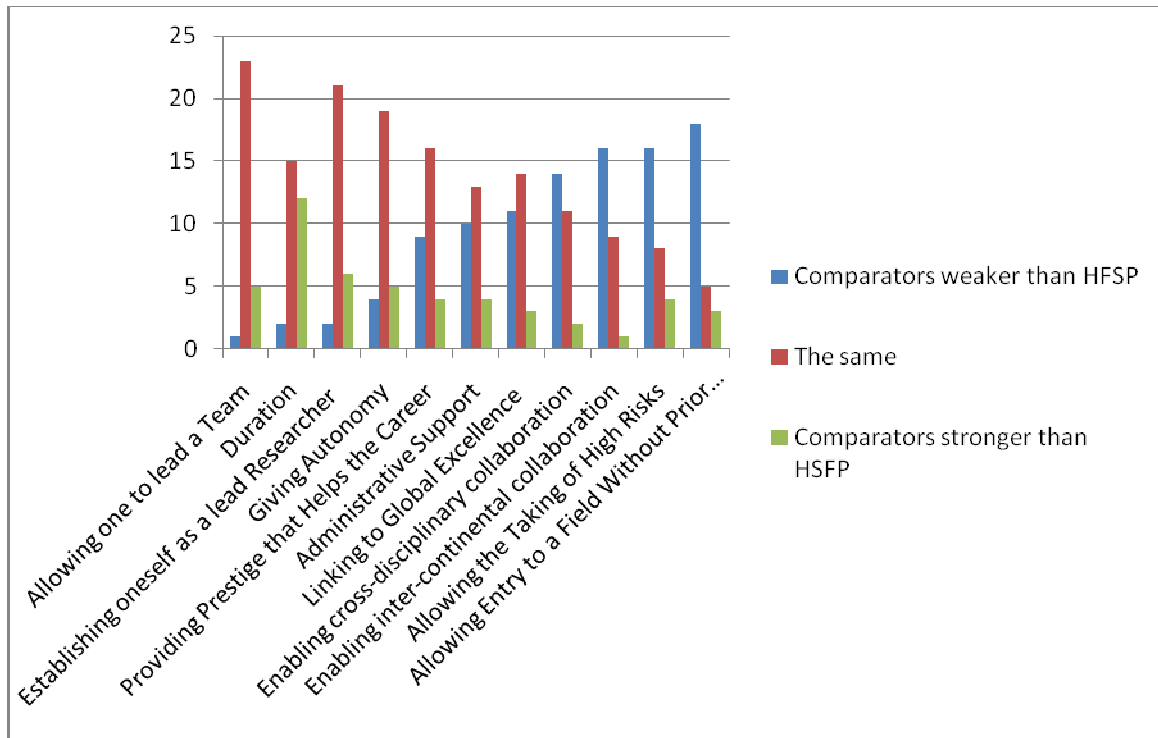
The following table is laid out in the order of the difference between the second and the fourth columns.

Table 68 Comparative Performances – HFSP and Other Schemes

Performance Aspect	Considerably Weaker Than HFSP (i.e. HFSP is better)	The Same	Considerably Stronger Than HFSP (i.e. comparators are better)
Enabling inter-continental collaboration	16	9	1
Allowing Entry to a Field Without Prior Reputation	18	5	3
Enabling cross-disciplinary collaboration	14	11	2
Allowing the Taking of High Risks	16	8	4
Linking to Global Excellence	11	14	3
Administrative Support	10	13	4
Providing Prestige that Helps the Career	9	16	4
Giving Autonomy	4	19	5
Allowing one to lead a Team	1	23	5
Establishing ones as a lead Researcher	2	21	6
Duration	2	15	12

The following figure (fig 21) presents the data from the previous table. The figure shows the extent to which the HFSP is considered stronger or weaker or the same as other schemes. Most of the schemes with which respondents made comparisons, are favourable to the HFSP

Figure 21 Comparative Performances – HFSP and Other Schemes



3.4 Grant and Young Investigator Grants

3.4.1 Some basic data of the sample

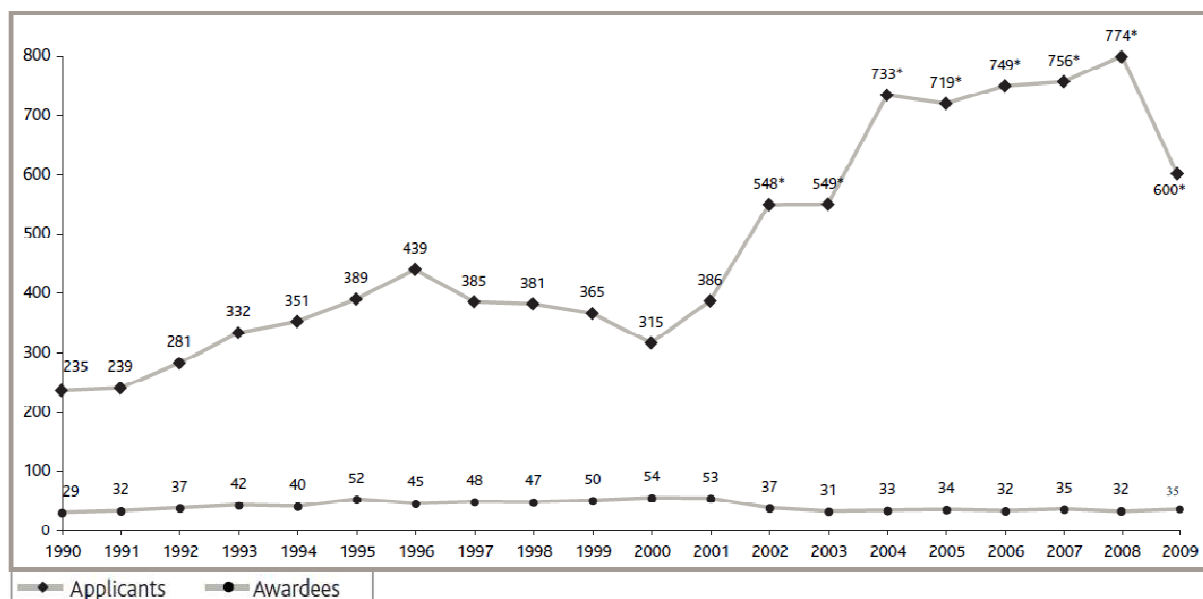
The HFSPPO in its annual report 2007 summarises the nature of the grant scheme as such (emphasis the authors): “Research Grants are awarded for **collaborative projects of fundamental research** carried out by a **team** of two to four scientists from different countries. Research teams must be **international** and **preferably intercontinental**. In addition to these basic criteria, emphasis is placed on the **inter-disciplinary** nature of the collaboration. Grants are awarded for a **period of three years** to teams who wish to combine their expertise to approach problems in the life sciences that could not be answered by individual laboratories. **Priority** is given to **novel collaborations** that bring together scientists **from different disciplines** (e.g. biology, chemistry, physics, mathematics, computer science and engineering). To stimulate novel, daring ideas and innovative approaches, preliminary results are not required and applicants are expected to **develop new lines of research**. The **Principal Applicant’s laboratory** must be **located in one of the member countries** while the other team members may be situated anywhere in the world.”¹⁷. As regards the internationality of the collaboration, due to the enlargement of HFSPPO member countries in the last decade, the pool for international collaboration countries has increased.

In addition to the pre-existing Programme Grant scheme, in 2001, the HFSPPO introduced, next to the existing Program Grant (PG) the Young Investigator Grant (YIG) for young researchers who are within the first five years of obtaining their independent position. Since 2005 the YIG offers the same conditions for the scientists as the program grant (PG), i.e. teams in both schemes “receive 250 thousand USD per year for two members, 350 thousand USD for three members, and 450 thousand USD for four or more. Local collaborations in the same country are permitted but teams only receive funds equivalent to 1.5 team members if the collaboration is truly interdisciplinary.”¹⁸

¹⁷ HFSPPO (2008): Annual Report 2007, Strasbourg, p. 30

¹⁸ HFSPPO (2008): Annual Report 2007, Strasbourg, p.31

Figure 22: The development of grant applications and awards



Source: HFSP (2009): Annual Report 2008, Strasbourg, p. 29

For the period 2002 to 2008 there were 463 grant awards, thereof 373 PG awards and 90 YIG awards. 183 grantees responded, which is a response rate of 40%. The survey sample contains 134 PG holders (36% of all up to 2008) and 48 YIG holders (53% of all up to 2008). The response rate is stronger for men (see Table 2 in the methodology section above).

All grantees were asked in which sector they are currently employed and all but one out of the grantees have remained in scientific research within academia. The grant community is, as was to be expected, well established in their academic careers. Finally, the sample represents the history of the schemes nicely, as respondents are distributed across the various years, with first PG finishing as early as 2002, and the first YIG in 2003.¹⁹

3.4.2 Country Distribution and Award History

As shown in the introduction chapter, the various schemes of the HFSP build upon one another. The grant scheme is the final part of the HFSP tree of schemes to build up careers.

A small share of grant holders had applied for their grant scheme with a first version of the specific project proposal before (21 % of all PG holders and 17% of YIG awardees). Table 69 below shows the award history in the sample, the YIG grantees have a stronger HFSP history than PG holders. Asked about future plans to apply again for a grant, only 10 % of grant holders said they would not do so, while 42% intend to do so and 28% do not know yet. 60% of the YIG holders intended to reapply with HFSP, 37,5% did not know yet, only 1 individual out of 48 YIG said he would not reapply.

¹⁹ However, the number of missing values for this question is rather high, a match with HFSP data for the final report will allow for a fuller picture.

Table 69: HFSP award history of grant holders in the sample

	PG		YIG	
	applied	received	applied	received
Grant (other proposal)	50	21	12	2
Long Term Fellowship	6	3	12	8
Short Term Fellowship	3			
Cross Disciplinary Fellowship			1	1
Career Development Award			2	2

Note: the number of respondents to the specific questions vary and are, in general, low

The grant scheme allows geographic flexibility for the awardees, even if their application has been done with a specific host organisation. 23 (17%) of the PG holders and 10 (21%) of the YIG holders have moved during the lifetime of the grant.

3.4.3 The research under the grants

As with other schemes, we asked the grant holders about the research they performed within the grant. When given the statement that they **could perform exactly the research they wanted**, respondents were **overwhelmingly affirmative**, roughly 90% answered to agree moderately or fully (Table 8). This means that fellows are not pushed in certain directions in order to get their awards, but rather can design the projects as they want to.

Table 70: Research: Could you pursue exactly the research you wanted with the grant

	PG		YIG	
	6	6,7	3	6,5
not agree				
agree only in part		0	1	2,2
indifferent	9	4,5		0
agree moderately	29	21,6	13	28,3
fully agree	90	67,2	29	63,0
Total	134	100,0	46	100,0

Note: answers for those agreeing moderately or fully

Asked if they had done the project anyway, without the HFSP support, 23% of the PG and 25% of the YIG said that they would have done it anyway. These numbers are much lower than for the LTF and CDF (see above). This is important; it means that **75% of those who are funded would not have been able to put this project idea into practice**. The opportunities the grant schemes offer are unique, the leverage, the added value of the grant is considerable, it allows to do very specific projects and assemble specific international project teams.

In addition, those (rather few) grant holders who would have done the project anyway were asked to state how the project would have differed without the grant. It shows that the **added value** of the HFSP for those scientists is **considerable, especially** as regards **international and inter-continental collaboration** and the **risk taking** (leading edge). In detail, that means that out of the 32 PG who would have done the project anyway a strong majority agree or strongly agree to the statements that they would have done the project only partially (56%), with less financial resources (59%), less cutting edge (74,2%), with less suitable equipment (60%), the project would have taken longer (84,4), it would have lacked a crucial research aspects (57%), would have had less international (75%) and less intercontinental (75%) partners, would

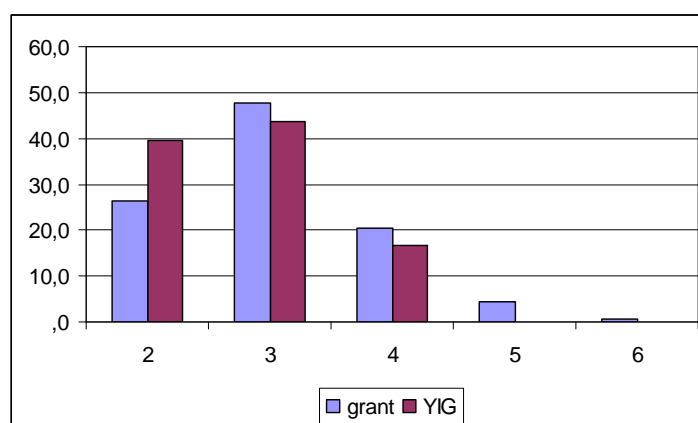
have had less collaboration with other Life Science disciplines (54%) or other disciplines (53%).²⁰

3.4.4 Collaboration

The major idea of the grant scheme is collaboration, international and between different areas and disciplines. Figure 23 below shows the number of international partners per scheme. The bulk of projects have 3 or 4 partners. On average the PG, in which project leaders are more senior, have slightly more partners (3,36 PG vs. 2,75 YIG).

The projects stretch over 2 to 6 countries, the majority of project have institutions from two and three countries, to somewhat lesser extent 4 countries. The grant schemes foster **new international collaborations**. While 91% of PG respondents and 78% of YIG respondents had international collaborations before the grant, for **almost all of the respondents** (94% of all PG and 98% of all YIG) the projects involved **at least one new international partner**. For 39% of all PG holders and 53% of all YIG holders their project did not involve any partner they had previously collaborated with.

Figure 23: Number of international partners (%)



The international partnerships were **essential for the conduct and quality** of the projects. For both schemes, roughly two thirds of respondents indicated that they could not have done the project only with national partners, another 30% said the project would have been worse.

One distinctive characteristics of the HFSP is to foster **inter-continental collaboration**. Most importantly, the grant schemes have **triggered new combinations** on a truly intercontinental level. 97% of all PGs and 96% of all YIG had intercontinental collaborations. Out of those, the table below shows how the project participation spreads across continents, by far the most spread across 2 continents, a considerable number of projects spread across 3 continents; again, this is more pronounced with the PG. For 92,2% of the PG and 96% of the YIG the HFSP fostered **new intercontinental collaboration**

²⁰ As only 13 of the YIG holders would have done the project anyway, a separate depiction of the results is not needed, the general picture is the same.

Table 71: number of continents involved

Number of continents	PG		YIG	
	N	%	N	%
1	1	,8		
2	79	61,7	39	84,8
3	43	33,6	6	13,0
4	4	3,1	1	2,2
5	1	,8		
	128		46	100,0

Collaboration, especially if it is across long geographical distances, needs explicit integration attempts. Even if the internet and other ICT means can provide for exchange and co-ordination substantial mutual visits are still one important means of collaboration and an indicator of its intensity. Respondents were asked how often in the project there were **mutual visits** between partners that lasted longer than one week. Only taking finished projects into consideration, each PG reported 3,5, each YIG 2,5 of those visits. Table 72 below gives a second indication of integration, it shows the **number of times projects have exchanged personnel**. Around **80% indicated that they did so**; more than 13% did so more than 3 times.

Table 72: Number of exchanges of personnel (post-docs, PhD students) between teams

	PG		YIG	
	N	%	N	%
1-3	53	63,1	12	63,2
4-6	10	11,9	2	10,5
7-10	1	1,2	1	5,3
>10	1	1,2		
missing	19	22,6	4	21,1
Total	84	100,0	15	100,0

Note: only the finished projects taken into account
missing reported as the option "none" was not given, missing can be interpreted as "none"

The overwhelming majority of respondents reported that the **project members were integrated as needed** in the projects (84 % PG, 88% YIG). The questionnaire offered a range of alternatives as reasons for a lack of integration. As the overall number of those not satisfied with integration is low, this only gives an indication to improve at the margins. The reasons most often mentioned were that a team member did not contribute to the project as expected (13 cases) and communication difficulties (8 cases). The "solution" for underperformance of one team member in most cases is that the work is transferred to some other team member (11 cases); in few cases this led to a reduction of resources for the underperforming team member. (6 cases).²¹

To assess the **difference** in terms of **collaboration** between **grant projects** and **post grant** research, those respondents whose grant had finished were asked, with how many labs they collaborated "within the last year" (i.e. after the grant). This number was then compared to the number of partners in the finished HFSP project. It turns out that **the scope of collaboration is considerably higher during the HFSP project than after its completion**. On average, the respondents report 1,47 partners more, only 4 out of 127 respondents across both schemes

²¹ One respondent in the open text field reported that he/she wanted to reduce the funds of one underperforming member, but this member refused and thus this was not possible.

report to have more partners now than during the grant, and 12 report the same number of partners. Almost one third say they had one more partner in the HFSP compared to the previous year, 20% report two more and roughly 10% 3 to 5 more partners.

The **difference in international scope** is similar, on average **after the grant had finished**, the number of different countries involved in collaborations **has diminished by 1,51** partners. 37% of the 127 cases answering the question report 1 country less, 35% 2 countries less involved in their co-operations within the last year compared to the grant project. More striking even is the **reduction in inter-continental cooperation**. 60% report that after the in the last year their collaboration partners represented one continent less than during the grant, 23% say even 3 continents.

These difference, obviously, do not indicate that co-operations within the grant do not persist, 90% of PG holders and 97% of the YIG holders (finished projects only) state that **they still collaborate with at least one partner of the grant projects**. More importantly, the grant holders also report that the HFSP has **improved their options for future international and inter-continental collaboration considerably** (Table 73). Around two thirds of those responding to this question indicate moderate or huge improvement, whereby the effect is – naturally – higher with the YIG.

Table 73: Improvement of options to collaborate internationally and intercontinental

	PG		YIG	
international				
Not improved at all	2	1,8		
Partially improved	5	4,6	4	10,0
Moderately improved	28	25,7	3	7,5
Considerably improved	44	40,4	13	32,5
Hugely improved	26	23,9	16	40,0
Too early to tell	4	3,7	4	10,0
Total	109	100,0	40	100,0
intercontinental				
Not improved at all	3	2,8	2	5,1
Partially improved	9	8,4	3	7,7
Moderately improved	22	20,6	3	7,7
Considerably improved	39	36,4	15	38,5
Hugely improved	29	27,1	12	30,8
Too early to tell	5	4,7	4	10,3
Total	107	100,0	39	100,0

The HFSP grant scheme also invites for collaboration between areas (within life science) and with other disciplines. Almost **half of the PG holders** and **two thirds of the YIG** report **collaboration with other disciplines**. Table 74 indicates how the other disciplines are represented in the grant scheme (with chemistry being most important). It is important to note, however, that the 61% of the PG holders and 65% of YIG holders had had inter-disciplinary experience before the grant. A minority report that they would not have collaborated with other disciplines without the grant (20% PG and 13,5% of YIG).

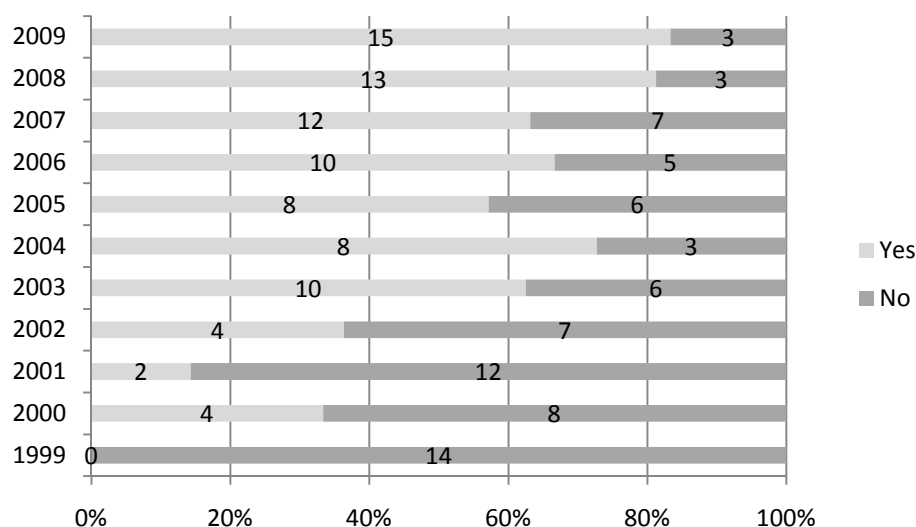
Table 74: Disciplines represented in inter-disciplinary collaborations of grant holders

	PG		YIG	
	N	%	N	%
Involved inter-disciplinary collaboration	58	48,7%*	29	66%*
<i>Representation within those:</i>				
		%**		%**
Life Sciences (if grantee is no life scientist)	4	6,7	2	7,1
Chemistry	7	11,7	3	10,7
Physics	25	41,7	13	46,4
Mathematics	6	10,0	2	7,1
Engineering and Technology - Computer Science	9	15,0	4	14,3
Engineering and Technology – not Comp. Sci.	6	10,0	3	10,7
Other disciplines	3	5,0	1	3,6
Total	60***	100,0	28***	100,0

*% of sample, **% of those indicating inter-disciplinary collaboration
 ***deviation to above due to double references and one missing entry

Looking at the development of interdisciplinary collaboration over time (Figure 24), we can clearly see a rise in inter-disciplinarity between 1999 and 2004, and a further rise after 2007), so that in the latest year, 2009, more than 80% (15 out of 18 who answered that year) were interdisciplinary.

Figure 24: Share of projects that involved inter-disciplinary collaboration



The **collaboration with colleagues from other areas within life sciences** is higher, roughly **80%** of grant holders report to be engaged in those collaboration. Again, this is roughly equal to the share of respondents who already had collaboration experience with partners from other areas before the grant. Equally, the share of respondents saying that without the HFSP grant they would not have worked in collaboration with other areas within life sciences at all is rather small (below 10%).

Interestingly, the share of respondents that collaborated with colleagues from other areas within Life Sciences is stable over the 10 years covered in this report. This is in stark contrast to the development of inter-disciplinary research which has strongly developed over the years as seen

above. In the **last two years**, the **share of respondents** collaborating **across disciplines** is **as large** as the share of respondents collaborating **across areas within Life Sciences**.

However, although the share of scientists who had previous collaboration experience (with other areas or with other disciplines) has not grown through the grant, and also most of the grantees would have collaborated with other disciplines even without the grant, the respondent overwhelmingly report **an improvement in the capabilities to do cooperate**. Slightly above 50% of PG holders and 58% of YIG holders state they have considerably or hugely improved **their capabilities to cooperate across disciplines as well as across science areas**.

In short, the grants do allow high level collaboration on international and inter-continental scale; the schemes intensify and enlarge international cooperation. By doing so, they allow to continue and deepen (not too often initiate) inter-disciplinary collaboration on this enlarged international scale, and thus the options and capabilities to collaborate internationally and across disciplines and areas.

Table 12 informs about hurdles for inter-disciplinary collaboration as seen by the respondents. For grantees the understanding of approaches from scientists of other disciplines and the availability of funding are by far the hurdles most often mentioned.²² The interviews, while confirming the unique possibility to do international interdisciplinary collaboration, also confirm the challenges, especially as regards finding the appropriate partners on all levels, e.g. specialised technicians. However, with the strong preference for inter-disciplinary or inter-area collaboration projects in some cases might be formulated too ambitious which then, because of the risk taking character of the HFSP, is undervalued in the process.

Table 75: Collaboration Hurdles With Other Disciplines*

	PG	YIG
Understanding of approaches among colleagues from different areas	46,3	52,3
Finding appropriate scientific journals for publishing scientific results	18,0	20,5
Academic reward system does not reward inter-disciplinary approaches (e.g. peer review)	14,8	32,6
Younger scientists are hampered through their dependency on senior scientists	26,2	13,6
The often found perception that inter- disciplinary research would be less solid and have less valuable results than mono-disciplinary research	16,4	14,0
The availability of funding opportunities for early career scientists to do interdisciplinary research	46,7	60,5
Total N responding	123	43

*% of responding N who rated the issue as a significant or very high problem

Finally, the questionnaire asked for an assessment of the overall benefit – cost ration of various forms of collaborations. Overall, roughly **three quarters** of the respondents in the two schemes assign a **positive benefit-cost ratio** of the various forms of collaboration (slightly or much more benefit) across all three dimensions of collaboration. On the negative side, there is a minority of 14% YIG grantees who rate the costs of international collaboration much or slightly higher than the benefits.

²² An analysis of collaboration hurdles with other areas

Table 76: the overall cost-benefit assessment of different forms of collaboration in grants* (%)

	disciplines		areas		International	
	PG	YIG	PG	YIG	PG	YIG
Produced much more costs than benefits	4,3	2,3	4,2	2,4	3,3	4,5
Produced slightly more costs than benefits	5,1	2,3	3,4	2,4	4,1	9,1
The benefits and the costs were well balanced	22,2	18,6	18,5	16,7	17,4	11,4
Produced slightly more benefits than costs	11,1	2,3	22,7	16,7	22,3	27,3
Produced much more benefits than costs	57,3	74,4	51,3	61,9	52,9	47,7
Total N	117	32	119	42	121	44

Finally, although the grant is not about changing research discipline (in contrast to the CDF), the analysis still assess the extent to which the grant project has triggered a change of disciplines anyway. 66 PG grantees and 24 YIG grantees reported to have considered changing research disciplines, and out of those 24 PG grantees and 13 YIG grantees report that the grant had much or partly influenced their decision to change disciplines.

3.4.5 Impact on the awardee's organisation

The grants with their requirement for complex collaboration may lead to organisational adjustments. First of all, respondents were asked if they did research within the grant project that in fact broadened the thematic scope of the organisation. Indeed, **slightly more than 75%** of the grantees in each scheme confirm that they could do **research in areas that were not represented in the organisations before**. Beyond the thematic changes, the major changes are a gain in **reputation** and – to a lesser extent – **more autonomy** for the researchers involved (Table 77). Interestingly, fewer of the YIG grantees see changes in their organisations as regards international collaboration. This may indicate the growing trend in recent years whereby research organisations and Universities already engage more and more in internationalisation strategies at organisational level²³.

Table 77: Changes the award triggered in the awardees' organisations*

	PG	YIG
more flexibility as regards research areas	5,4	2,2
more inter-disciplinary research	11,6	6,7
more international collaboration	16,9	4,4
giving researchers more autonomy	21,7	18,2
...introducing new technical infrastructures	15,4	15,6
...enhanced the prestige of the laboratory and/or institution	36,9	35,6
N	130	48

* answers % of those who indicate a **major** change

²³ This has been the result for a study on German Universities and research organisations, Edler, J. et al. (2007): Internationalisierung der deutschen Forschungs- und Wissenschaftslandschaft. IRB Verlag, Stuttgart.

3.4.6 Output and impact

As with the other schemes, respondents were asked a whole range of impacts. This question complements the bibliometric analysis that focuses on academic impact in terms of publications and citations. Respondents were asked a set of more qualitative questions to self-assess the impact the HFSP award had on them.

Table 78 shows the level of agreement for the different types of impact asked for. It differentiates between “agree” and “strongly agree” in order to illustrate the share of awardees who feel strong positive impact. Again, overall, the impact is felt to be strong or very strong. The highest impact on this basis is on the **career development very generally**, with 90% of YIG and 80% of LTF agreeing or strongly agreeing. Further as regards **career development**, 33% of PG grantees (43 out of 129) and 53% of YIG (21 out of 40) LTF indicated that they obtained a position **during** their grant.

Similarly, the effects on **scientific horizon** and **broadening of research fields** feature very strongly as well as the reputation and visibility effects. As for **peer reviewed journal publication**, the impact is felt to be less strong, but still around 40% of respondents reported that the speed of publications has increased because of the grant.

Table 78: The impact of the grants. The award...

accelerated the rate of peer reviewed publication		
PG	Agree	37,8
	Strongly agree	7,9
YIG	Agree	30,0
	Strongly agree	7,5
broadened the kinds of journals I publish in		
PG	Agree	32,3
	Strongly agree	44,9
YIG	Agree	31,7
	Strongly agree	7,3
broadened up the research fields I am working in		
PG	Agree	61,4
	Strongly agree	20,5
YIG	Agree	54,8
	Strongly agree	26,2
heightened my international visibility		
PG	Agree	61,4
	Strongly agree	25,2
YIG	Agree	55,8
	Strongly agree	20,9
increased my reputation		
PG	Agree	62,2
	Strongly agree	23,6
YIG	Agree	62,8
	Strongly agree	25,6
improved my access to key communities		
PG	Agree	43,3
	Strongly agree	18,9
YIG	Agree	34,9
	Strongly agree	20,9
broadened my scientific horizon (methods / themes)		
PG	Agree	47,2
	Strongly agree	39,4
YIG	Agree	44,2
	Strongly agree	51,2
increased the number of co-published peer review articles with international partners outside my host institution		
PG	Agree	47,2
	Strongly agree	22,0
YIG	Agree	50,0
	Strongly agree	21,4
the award had a crucial positive effect on my career development		
PG	Agree	39,5
	Strongly Agree	41,1
YIG	Agree	31,8
	Strongly Agree	59,1

3.4.7 HFSP communication and community

Communication to potential grantees is important to inform the entire target group of the scheme. Table 79 shows how grantees learned about the scheme. They learned from the community mainly (colleagues, other grant holders) and the website, and often they heard about HFSP from different sources (multiple references).

Table 79: How grantees learned about the award

	PG	YIG
Colleagues/advisors	81	33
HFSP grant holders/Fellows	45	19
Direct information from other persons affiliated with HFSP (e.g. present or past reviewers, members of review committees, council of Scientists)	30	2
The HFSP web site	46	11
The HFSP call for applications mediated through domestic institutions	22	8
The call for applications in scientific journals (print or online)	21	4
Presentations by HFSP staff	3	
None of the above	1	

Table 80 shows how intensively grantees use the various communication means. There are striking differences between the YIG grantees and the PG grantees, with the YIG grantees relying more on the web-site, while the PG grantees rely more on the newsletter and the annual report.²⁴

Table 80: The usage of HFSP information means

	PG	YIG
HFSP web site	28,7 (40,3)	40,9 (43,2)
HFSP e-mail newsletters	43,3 (36,2)	15,9 (45,5)
HFSP Annual Reports	34,9 (41,3)	9,1 (36,4)
	126	44

* % of respondents indicating to use often or intensively (brackets: those using moderately)

The survey further asked if the fellows are/were part of a **particular HFSP community**. Again there is a difference between the PG holders and the YIG grantees, as more than 40% of the YIG grantees do feel “very much” or “frequently” part of the HFSP community, the PG grantees, who in general are slightly more advanced in their careers and thus have been holder of other grants, feel less so (Table 81).

²⁴ The questionnaire also asked for suggestions for further communication means, there is no suggestion that appeared to be widely demanded, the list of suggestions will be part of the annex of the final report.

Table 81: Share of respondents feeling as part of a particular HFSP community

	PG		YIG	
	N	%	N	%
Not at all	25	21,0	2	4,5
Rarely	28	23,5	10	22,7
In a number of occasions	41	34,5	11	25,0
Frequently	18	15,1	13	29,5
Very much so	7	5,9	8	18,2
Total	119	100,0	44	100,0

The **annual meetings** are one means to build up community and networks. More than 90% of the YIG have attended the meeting once or more than once. The PG grantees are less active, 44% attended once, nearly 10% more than once.

Table 82: Attendance of HFSP annual meetings

	PG		YIG	
	N	%	N	%
Have you attended the annual HFSP meetings?				
Yes, once	55	43,7	23	51,1
Yes, more than once	12	9,5	18	40,0
No	59	46,8	4	8,9
Total	126	100,0	45	100,0

The **importance of the meetings are considerable** – and are in general rated higher by the YIG than by the PG holder. Overall, the highest score is given to the importance for the **visibility** of the HFSP (65% of YIG holders and 53% of PG holders rate the meetings to be very or extremely important) and the **funded work** (55% YIG, 50% PG rate very or extremely important). As regards **building and maintaining networks**, there is some considerable difference again between PG, of which only one fourth state that the meetings are very or extremely important, and the YIG, of which 44,2 % (maintaining networks) and 35% (creating networks) felt the network to be very or extremely important.

This has been strongly confirmed by the interviews. While the programme is highly praised for its risk-taking and international and inter-continental collaboration requirements, young investigators felt that networking, within and beyond the concrete research project, is key and should even be more supported. For example, a network of YIG and other interested awardees was suggested, moderated by the secretariat. This could also link to the alumni idea.

One further means to build up a stronger HFSP community and identity is an **alumni organisation**. This would **clearly be welcomed** by the **majority of YIG** (62 % of YIG would be clearly interested; another 37% would be partly interested). The PG holders are slightly more reserved, but still 31% would be clearly interested, 48% partly.

3.4.8 Comparison to other programmes

As with other schemes, the respondents were asked for overall assessments and comparisons to other programmes. **Only a minority** of 29 PG holders and 11 YIG holders **answered** the request to name the **one most appropriate (comparator) programme** that could have funded the HFSP funded work the same way. This is a first indication for the “uniqueness” of the HFSP grant schemes. Further, the open text field does not bring to the fore a set of clear comparators,

many respondents indicated that they found HFSP grants unique – especially as it is more targeted and funds more risky research. The programmes with multiple references for the YIG are ERC (4), EC (generally), NIH (2), for the grants, EU FP (7), ANR (4), NIH²⁵ (6), but some of those references are qualified (“maybe”).

29 PG grantees and 12 YIG holders tried to get a grant in the comparator programme (18 PG and 8 YIG holders were actually successful in getting another grant). 28 PG holders and 12 YIG answered the request to rate some features and the overall benefit of the alternative programme with the HFSP. Table 83 shows how the grantees rated the alternative programme to the HFSP. **Across all categories** that were asked for, the HFSP was rated **considerably better** or equally good, there are only **extremely few cases** in which the comparator programme was rated slightly stronger. The HFSP is extremely strong in providing inter-continental cooperation, risk taking and moving across fields. Equally, the grant duration seem to be beyond the standard for comparators.²⁶

Table 83: How do you rate the HFSP in comparison to that (comparator) programme? (N)

	Much worse	worse	Similar	better	Much better	N
Duration		13	18	6	3	40
Administrative support	1	4	13	11	11	40
Enabling moving into a new field without track record in this field	3	2	8	10	15	38
Providing prestige that helps in further career (grants, partners)	1	5	11	13	9	39
Linking to global excellence	2	3	6	11	17	39
Allowing to take high risk	4	1	8	11	15	39
Enabling cross-disciplinary collaboration	1	1	12	10	15	39
Enabling inter-continental collaboration	3	3	2	6	25	39

For the second part of the study it was envisaged to look at a comparator programme. While for the LTF/CDF the comparator seems obvious (EMBO), it is less obvious in the case of grants. All in all, out of 182 respondents in the grant samples, there are only 19 individuals who have rated the HFSP *in at least one of the above categories* worse or much worse. Those 19 individuals have named 7 different programmes, ERC (6), EU (3, one of which NEST), ANR (2), NIH 4, HHMI, CREST (Japanese, but not international). Picking the category with most references to “much worse” (funding risk taking), there are four different programmes for which individuals stated that HFSP is worse or much worse in funding risk taking than the HFSP (ANR (2), ERC, “EU”, NIH). From the broad range of programmes, most of which only mentioned once, the choice for a potential comparator programme is not straightforward. Comparison on that basis is not compelling.

²⁵ One interesting comment about the NIH was that the initial proposal was not funded because it was too “uncertain”, but the NIH funded follow up work from the HFSP project.

²⁶ This is true even if in the interviews suggestions have been made to allow for extensions, as the set up time for own labs is

3.4.9 Grant flexibility and quality

In a last section of the questionnaire, the survey asked about a set of specific financial conditions within the grant schemes. **Half of the PG holders** (N=65) and slightly **more than half of the YIG** (N=23) who answered the question took advantage of the **possibility to allow for an unequal distribution of funds** between team members and to vary it each year as a function of the needs of the projects. Out of those who did not use this possibility, only 23 PG holders (17%) and 8 YIG holders (18%) did not discuss this option at all. In other words, the option for financial flexibility is highly important and grantees are aware of it and well considered (Table 84).

Table 84: Ways to use the financial flexibility in the grant schemes

	PG		YIG	
	N	%	N	%
Fixed as a function of the different types of contribution (e.g. wet lab/dry lab)	46	58,2	10	37,0
To enable a partner to acquire equipment essential to the common project at the appropriate moment	23	29,1	10	37,0
Other	10	12,7	7	25,9
Total	79	100,0	27	100,0

The open text field “other”, in which respondents could suggest alternative ways in which they spend the money within the team does not contain any dominant mode. In one case it was used to hire staff, in others to create incentives to better communicate, in two cases the respondents paraphrased the options given in the closed section, two indicated a shift of balance over the years (equal share overall, but different shares in different years), two mentioned exchange rate issues.

For 60 out of 123 PG respondents and 20 out of 42 YIG respondents the **financial flexibility is unique** compared to other programmes, which means that slightly more than half in each grant scheme see other programmes as having similar opportunities. However, 62% of PG holders and 86% of the YIG holders rate this function as being useful or extremely useful. Again, interviews strongly confirmed the assessment of high flexibility and low bureaucracy.

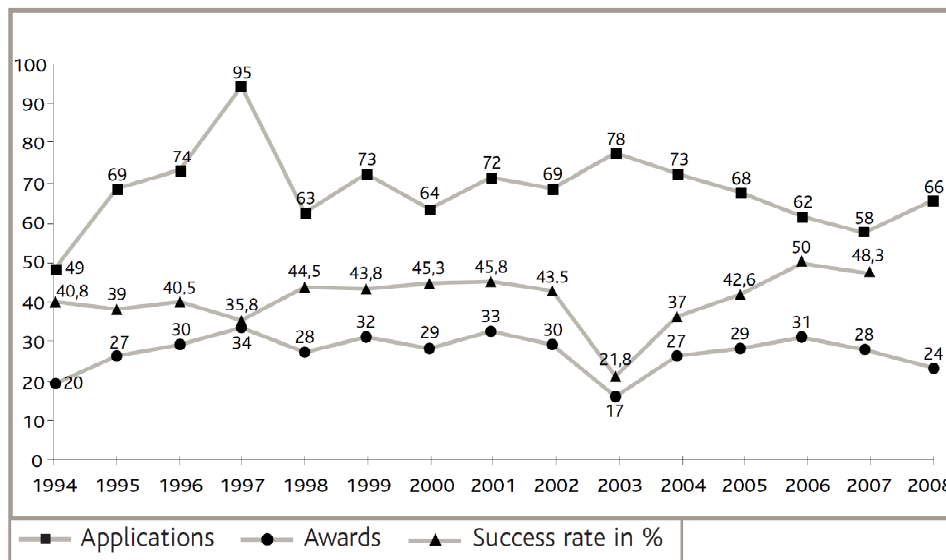
Finally, the HFSP lets the investigators **distribute the budgets freely between the allowable cost categories**. As to be expected, this feature is rated as being even more useful, 77,5% of grant holders see it as extremely useful, another 16,3% as useful (combined 94%), for the YIG the assessment is even more positive (88,4% extremely useful, 11,6% useful). This feature also seems to be less common in other schemes, only 38 PG (out of 128) and 11 YIG (out of 43) state that they know of other schemes who have similar possibilities. It appears that financial flexibility is of some comparative advantage to the HFSP.

3.5 Short Term Fellowships

3.5.1 Some basic data of the STF and the survey sample

The short term fellowship allows scientists to visit research organisations in another country for a period between 2 weeks and 3 months. It is not limited to certain types of applicants, however, applicants need to have a doctorate and some preference is given to young researchers. In addition, former LTF or CDF fellows can use the scheme to follow up on research they did in their fellowship host organisation. All in all, the scheme is meant to “support the creation and expansion of professional networks. This short term support enables young investigators to expand their professional network abroad by supporting research training.” (HFSP0 2009, p. 14). The scheme provides travel costs and per diem support.

Figure 25: number of applications and awards in the STF scheme

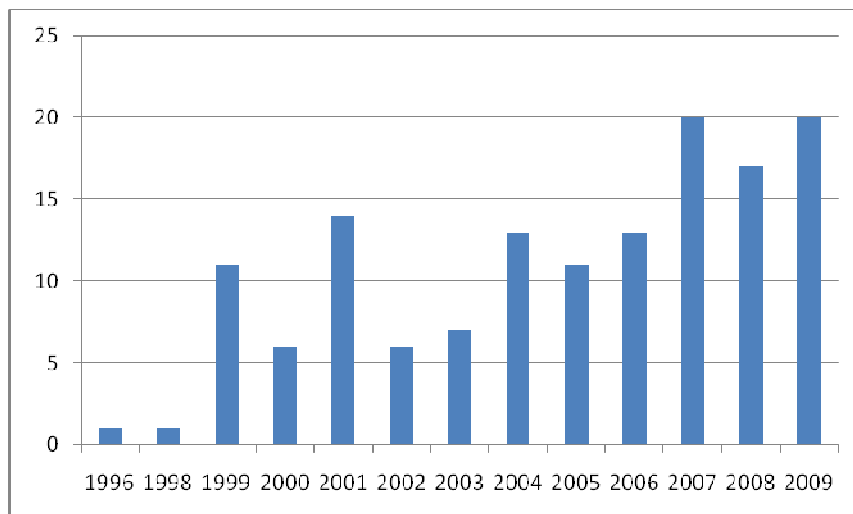


Source: HFSP0 2009, p. 20²⁷

From the data given in Figure 2 it follows that for the period of our analysis (1999 to 2008), 280 STF were awarded. We received 153 responses, and thus a rate of coverage of 55%. Figure 26 shows the sample responses per award year. It shows that especially the latest two years for which we have full data, 2007 and 2008, are represented very well, the 20 (2007) and 17 (2008) represent slightly more than 70% of all successful applicants in those two years.

²⁷ The application procedure for 2008/2009 was not complete when the report was drafted, thus there are no success rates for 2008.

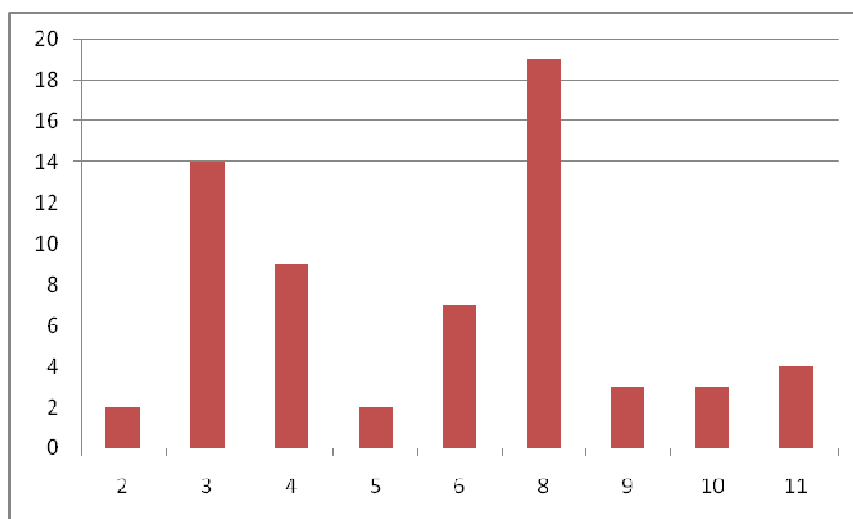
Figure 26: Number of STF awards received per year in the sample



Slightly less than 50% of all respondent stayed for the full duration of the STF, 12 weeks; the rest of the ST Fellows showed quite a variety of durations

Figure 27: The number of months STF awardees stayed abroad*

(displayed only those 50% not staying the full 12 weeks)



* in percent, x-axis displays number of weeks

The large majority of the 153 respondents are employed in academia still, less than 5% work in industry (Table 85).

Table 85: Sector of employment of STF fellows in the sample

	Frequency	Percent
Research at a university or non profit research institute	141	92.2
Research in a for profit company (e.g. biotech, pharma industry)	7	4.6
Unemployed	1	.7
Other	4	2.6
Total	153	100.0

3.5.2 Geographical and mobility patterns

An important question for all HFSP schemes is the participation and movements as for countries: where is the instrument mobilising most, and where do fellows go? Table 86 indicates the nationality of STF awardees, the country in which they completed their PhD, the country from where they applied for the STF, the host country of the STF and their current country of employment. This allows some analysis of geographical patterns in the various stages of a researcher and the relative role of the STF.

In our sample, academics from 35 countries are represented, with French and US Americans leading the table (16). There are some shifts when one considers the country in which they completed the PhD, indicating some of the well known brain circulation, with a specific attractiveness of the US and UK, as the share of respondents having finished the PhD in those countries is considerably higher than the share of UK and US nationals.²⁸ More interesting for the effects of the schemes is the comparison between the share of country representation in the sample when they applied (where they came from) and where they went (country of host organisations). Here we have some obvious patterns of attractiveness of countries. Some countries have more incoming than out-going STF awardees (such as Canada, Japan, Netherlands, UK, US), with the US being by far the most attractive country. 25 academics were based in the US when they applied, but 53 academics went to a US host organisation. In contrast, a set of countries have a “negative” balance, most notably Italy (9 outgoing, 0 incoming), Spain (13 outgoing, 4 incoming), Argentina (5 outgoing, 0 incoming) and France (16 outgoing, 11 incoming). However, as indicated above, the STF is not a stepping stone for permanent mobility. The figures in the last column in Table 86 (current employment) are again very close to the figures indicating where they originally applied from for the STF. The balance is not dramatic, the US (6) and the UK (4) have slightly higher numbers after the STF compared to before, and other shifts are marginal. This also means that the STF is no mechanism through which countries who struggle with their attractiveness actually lose scientists permanently in significant numbers.

²⁸ Interestingly, the UK is then again slightly less attractive for post-docs, while the US continues to grow its share also in the column „based when applying“.

Table 86: Nationality and location of different career and STF stages

	Nationality		PhD completed		based when applied		host institute		currently employed	
	N	%	N	%	N	%	N	%	N	%
Argentina	6	4.1	6	3.9	5	3.6	0	0.0	5	3.3
Australia	6	4.1	4	2.6	10	7.1	8	5.8	12	7.8
Austria	1	0.7	1	0.7	2	1.4	3	2.2	1	0.7
Belgium	1	0.7	1	0.7	1	0.7	1	0.7	1	0.7
Brazil	1	0.7	1	0.7	1	0.7	0	0.0	1	0.7
Canada	8	5.5	8	5.2	7	5.0	9	6.5	5	3.3
Chile	1	0.7	0	0.0	1	0.7	0	0.0	1	0.7
China, People's Republic of	1	0.7	1	0.7	0	0.0	0	0.0		0.0
Croatia	1	0.7	1	0.7	1	0.7	0	0.0	0	0.0
Czech Republic	1	0.7	1	0.7	0	0.0	0	0.0	1	0.7
France	16	11.0	18	11.8	16	11.4	11	7.9	18	11.8
Germany	12	8.2	14	9.2	11	7.9	11	7.9	13	8.5
Greece	1	0.7	0	0.0	1	0.7	0	0.0		0.0
Hungary		0.0		0.0	0	0.0	1	0.7		0.0
India	4	2.7	3	2.0	3	2.1	1	0.7	3	2.0
Ireland	2	1.4	2	1.3	1	0.7	1	0.7	2	1.3
Israel	3	2.1	4	2.6	1	0.7	0	0.0	0	0.0
Italy	10	6.8	8	5.2	9	6.4	0	0.0	6	3.9
Japan	6	4.1	5	3.3	4	2.9	6	4.3	5	3.3
Korea, Republic of (South Korea)		0.0		0.0		0.0		0.0	1	0.7
Mexico	2	1.4	2	1.3	2	1.4	1	0.7	2	1.3
Morocco	0	0.0		0.0	1	0.7		0.0	1	0.7
Netherlands	3	2.1	2	1.3	2	1.4	4	2.9	3	2.0
New Zealand	1	0.7	1	0.7	1	0.7	1	0.7	1	0.7
Poland	2	1.4	2	1.3	1	0.7		0.0	0	0.0
Portugal	1	0.7	1	0.7	1	0.7		0.0	1	0.7
Romania	2	1.4		0.0		0.0		0.0		0.0
Russia	3	2.1	3	2.0	2	1.4		0.0	1	0.7
Singapore	1	0.7	1	0.7		0.0		0.0	1	0.7
Spain	13	8.9	13	8.5	13	9.3	4	2.9	13	8.5
Sweden	3	2.1	2	1.3	3	2.1	2	1.4	4	2.6
Switzerland	3	2.1	2	1.3	2	1.4	5	3.6	3	2.0
UK	15	10.3	23	15.0	13	9.3	17	12.2	17	11.1
Ukraine	0	0.0	1	0.7	0	0.0	0	0.0	0	0.0
USA	16	11.0	22	14.4	25	17.9	53	38.1	31	20.3
<i>Total</i>	<i>146</i>	<i>100</i>	<i>153</i>	<i>100</i>	<i>140</i>	<i>100</i>	<i>139</i>	<i>100</i>	<i>153</i>	<i>100</i>

The overall rather limited effect of the STF on mobility is further confirmed when asked for the current employment. Table 87 shows that 12 % of the respondents actually now work in the host institution of the STF, and 4 % in another institute in the country of their STF host organisation.

Table 87: Institution of employment of STF fellows in the sample

	Frequency	Percent
Host institution of my award	18	11.8
Institution from which I originally came to the host institution	91	59.9
Other in country of host organisation	6	3.9
Other in country from which I came to the host institution	25	16.4
Other in other third country	12	7.9
Total	152	100.0

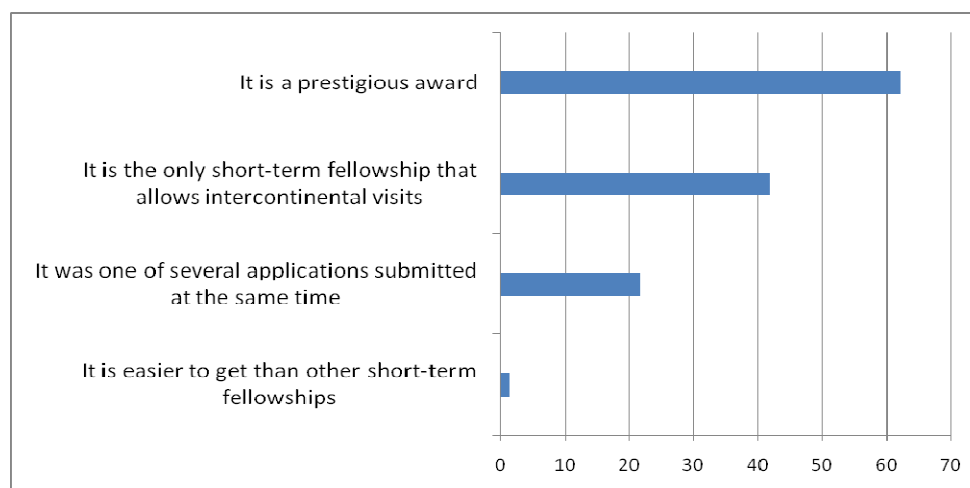
3.5.3 The relative position of the STF

Two questions as to the experience of funded work abroad shall illuminate the relative position of the STF. First, the questionnaire asked respondents to indicate if they ever had any other mobility grant next to HFSP. A large majority of HFSP – namely 83% out of 140 ST-Fellows who answered the question - indicated that the HFSP STF was their only short term mobility grant in their academic careers. 24 respondents had another short term fellowship. They did so from a large variety of funding sources, based in 10 different countries – there is no obvious “competitor” for HFSP from the perspective of the HFSP fellows. The only funding organisation mentioned more than once was EMBO with 4 STF, the countries with the most funding sources mentioned for alternative schemes to which respondents participates were Germany (5) and Spain (4).

A second question asked if the respondent had worked abroad for more than 2 weeks in the context of funded research prior to the STF. Here, 48 respondents (33% of 140) said that they had done so. This means that for a majority of 66% the STF has been an instrument for a first time stay abroad. On the other hand, in combination with the previous finding it indicates that mobility even prior to the STF has been possible even without specific mobility grants.

To understand the relative demand for the STF, the survey asked how often the respondents go abroad, on average, for a short term project stay. 21% do that once a year, 19% once every two years and 60% do it very irregularly and cannot really tell. Thus, the demand for stays beyond 2 weeks is somewhat limited, it is not a feature that scientists in general need on a regular basis.

Figure 28: Reasons to apply for the STF*



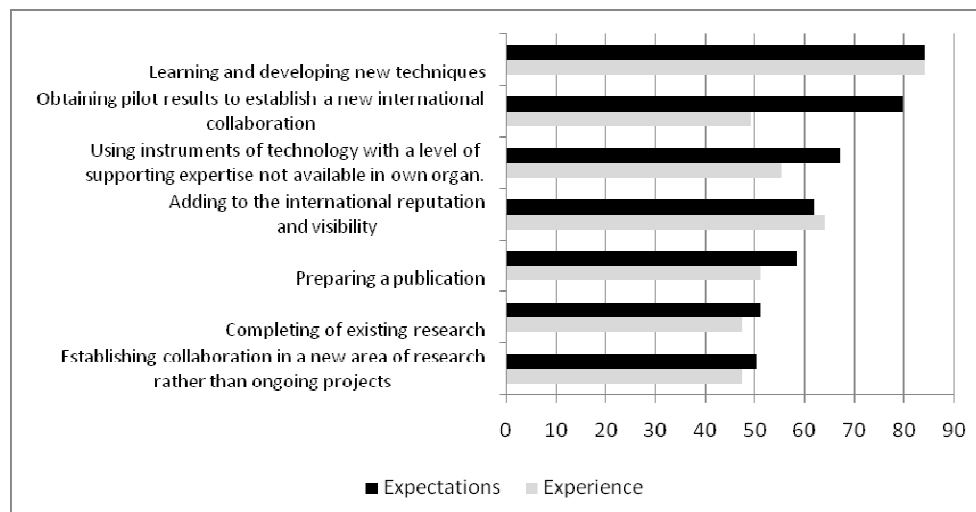
* In percent, multiple answers

Finally, the STF is an obvious means for former Fellows to finish off or follow on from their work during the fellowship. However, only 6 out of 137 respondents answering to that question (4%) indicated that they had held a HFSPO fellowship before. Slightly more, 9%, applied for the STF while they had an HFSPO grant.

3.5.4 The research within the STF

The survey asked about the motivations to do the STF *ex ante* (expectations) and the experience the respondent had regarding the specific motivations (experience). They were the importance a certain aspect had for their expectations as to the STF. The answering options were “of very little importance”, “quite important”, “very importance” and “extremely important”. Equally, for *ex post* they were asked how important the same aspect was for their experience, with the same answering options. Figure 29 shows that by far the most important reason out of those asked was to learn and develop techniques (most important) and using techniques with expertise support (third most important). The expectations here were largely fulfilled, especially as regards the learning aspect. The second most important expectation was to obtain pilot results to be used for future international collaboration beyond the STF. Here, for roughly 30% of ST Fellows the stay in the organisation abroad did not match their expectations. Apparently fellows were overly optimistic as to the concrete output of a short term stay. However, 50% indicated that for them preparing a new collaboration, i.e. “in establishing collaborations in a new area of research rather than ongoing projects” was very or extremely important, and this remained true also *ex post*.

Figure 29: Importance of selected aspects for the STF (top two, %)*



* Percent of those respondents who answered very important or extremely important

The STF may mean different things as for expectations and experience depending on the length of the stay. A statistical test (chi-square) showed one significant difference between the ST-Fellows who stayed the full 12 weeks and those that stayed less. 42 % of the ST Fellows staying the full 12 weeks valued the preparation of publications as extremely important, against 15% of those staying less than 12 weeks.

Comparing the HFSP to other schemes, respondents were first asked if any other scheme could have offered them a stay abroad under as HFSP STF did. Slightly more than one third confirmed that other schemes would have done it, 52% said no with the rest undecided. Thus, for more than half of the respondent STF was a unique opportunity. Only one of the respondents said that the alternative scheme would have been better than HFSP, half of the sample said other schemes would have been equally good, the other half claiming that HFSP would be better than comparator schemes.

3.5.5 Benefits for the home organisation

The idea of the STF is not only to link the individual researcher, but also to have effects for the overall structure of life science research. Thus, respondents were asked if their home organisation benefited from the OSP fellowship. 123 respondents, i.e. 80% of the 153 respondents, claimed that the host benefited. The benefit most often mentioned is the establishing of future collaborations with the host organisation and the home organisation, followed by the introduction of techniques back to the home organisation (see above). One quarter of all fellows indicate that the STF was instrumental to get further grants for the laboratory. A comparison between those fellows who stayed for the 12 weeks and those staying less than 12 weeks shows that longer stays do not increase the likelihood for benefits on the home organisation.

Table 88 Effect of Longer Stay on Benefits Arising

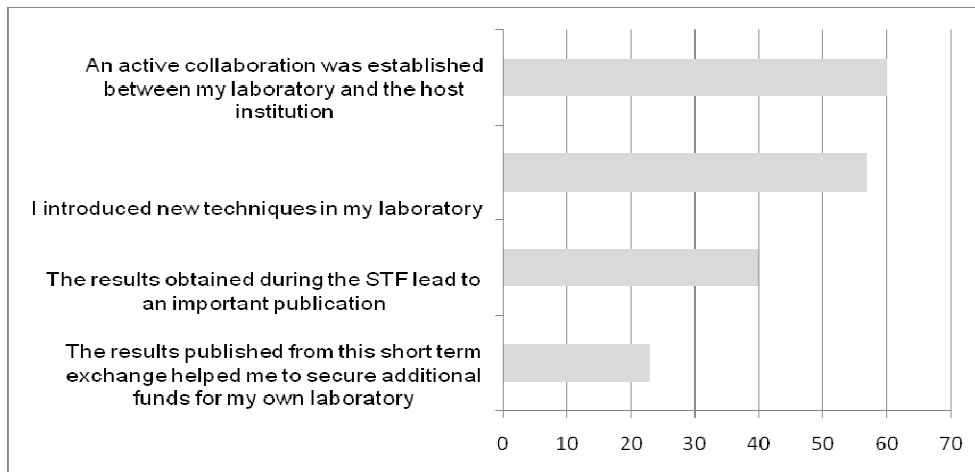
STF Longer than Ten Weeks * Did your home laboratory benefit from your HFSP Short-Term Fellowship?				
Count				
		Did your home laboratory benefit from your HFSP Short-Term Fellowship?		
		Yes	No	Total
STF Longer than Ten Weeks	Less than Ten Weeks Stay	52	7	59
	Beyond Ten Weeks Stay	68	10	78
	Missing	3	0	3
	Total	123	17	140

However, length of time spent does appear to make some difference in terms of the benefits accruing, although under the (binomial test) these responses are (in each case) not significantly better than chance.

Table 89 Test of Probability of Outcomes

Benefit	Stay Shorter Than 10 Weeks	Stay Longer Than 10 Weeks (Outcome) (k)	Trials (n)	Binomial Probability of Outcome Greater than Chance (50%) i.e. a One-Tail Test
New Techniques	38	47	85	0.192835
Active Collaboration Established	38	50	88	0.120397
Results during STF led to Important Publication	26	34	60	0.183147
Securing of Additional Funds	17	18	35	0.5

Figure 30: Benefits to the host organisation*

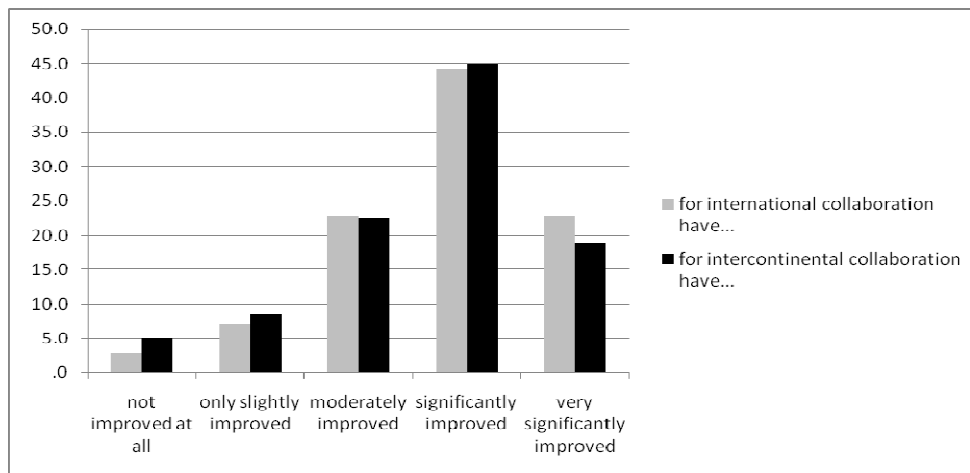


* multiple answers, percentage of respondents indicating that the alternative given to be true

3.5.6 Effects on future collaboration

The STF is also an instrument to improve the ability and opportunity for project collaboration in the future. As HFSP allows for inter-continental mobility, respondents were asked for improvement more generally (international) and as regards inter-continental collaboration. In fact, there are virtually no differences for international and inter-continental, roughly two thirds of respondents indicate a significant or very significant improvement as for the future options to collaborate.

Figure 31: The effect for collaboration*
The future option (regardless of discipline)...

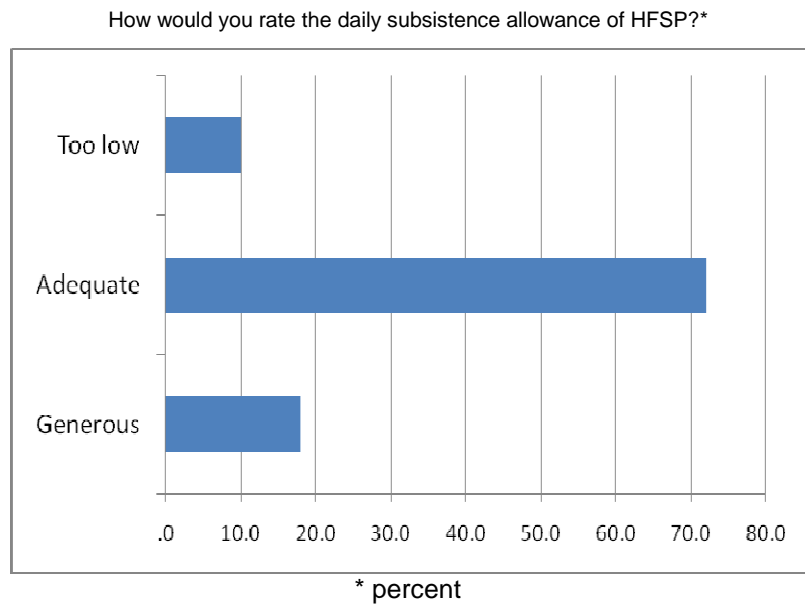


* percent

3.5.7 Quality of the Fellowship

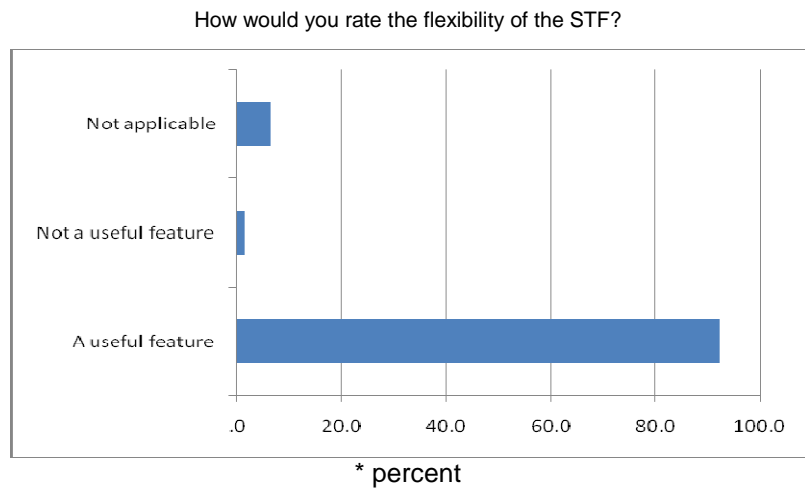
The financial support of the fellowship consists of travel costs and allowance. The ST-Fellows are on average content with the amount of the allowance, a few more than 70% think it is adequate, and slightly more (18%) think that it is generous compared to those that think it is too low (10%) (see Figure 32)

Figure 32: Assessment of the daily allowance



One specific feature of the HFSP STF is its flexibility in terms of application and starting date. This feature is overwhelmingly welcomed by the STF community (Figure 33).

Figure 33: Assessment of the STF flexibility*



3.6 Presentation of Analysis of Combined Data

During the course of the research, the Study Team including Evidence Ltd carried out a number of data gathering exercises, based on original data collected by the HFSP0 about publications and award data. Two major databases of information resulted (to supplement the already very comprehensive HFSP0 award data): a) Evidence Ltd's database of publication outputs from the review of the Web of Science's detailed bibliometric data relating to HFSP0 publications, and which is the subject of a separate report; - b) survey data obtained from the responses of awardees to the detailed questionnaires administered by the Study Team through on-line survey.

At an early stage in the research it was clear that, in addition to analyses of the data of these separate databases, contributing to bibliometric and award related understanding of the action of the HFSP0 respectively, it would be possible to link the data obtained from the two databases to facilitate queries involving both bibliometric and programme related aspects simultaneously.

This linking was achieved by using a relational database in which bibliometric data with the key field of "person code" was connected to data from questionnaires with an identifying field containing the same data. This linking process while technically straightforward was difficult to achieve as the questionnaire responses provided by awardees were anonymous, given the need of the Study Team to ensure objectivity and anonymity of respondents. However, questionnaire responses were examined and where possible, a research student was able to identify the responses given in the questionnaire and link the data to individuals. Once person code had been input into the questionnaire dataset, the bibliometric database could be linked to the questionnaire database.

This combined dataset has been used to carry out a number of queries and investigations that use bibliometric and award relevant data. Given the work involved in the preparation of the data, only the LTF (a key HFSP0 scheme) was reviewed. Around 1700 publications were considered in the data and 297 awardees responses (297 awards) were examined. The LTF is representative of much of the activity of the HFSP0 activities and the scheme's principles of interdisciplinarity, collaboration, internationally and between continents (intercontinental) are key themes within the HFSP0 mission.

While it would have been desirable to cover more schemes, a number of constraints applied. Thus, for the smaller schemes which had operated for a relatively short period, there were small numbers of responses and small numbers of publications. In such an instance, where the size of the usual database for querying purposes reflects the proportion of missing responses to each question – in effect the product of response proportions - actual useable responses (data points) would be very low. For example where there are 50 awardees of whom only 2/3 respond and about whom there is only 2/3 coverage of publications, the actual response proportion is 4/9 of the potential maximum. When small numbers of publications and respondents are considered, statistical effects may not be easily noted and the types of statistical test appropriate for analysis very limited in number.

The linked data joined information about the *output* of research (research impact) with the *conditions* under which the research took place as reported by the awardees. This leads potentially to answers to important questions about how conditions influence research outputs (we do not claim causation). Such an analysis can supplement and go beyond and that made possible by the solely bibliometric data present in the database provided by Evidence.

Impact was assessed in this analysis as a quality indicator – using the average value for papers produced. It might be considered that the impact measure chosen should reflect both quality and quantity of the papers produced, but while this manipulation of the data could have been carried out, it would, in our view have created mistaken confidence about the total impact of papers as a measure of volume which would not be justified as not all of the papers produced by the awardees were likely to be present in the dataset, their being a relatively strict process of inclusion of papers in the HFSP. Therefore it appeared more sensible to examine quality alone, rather than to create a combined measure based on the number of papers and the number of citations. Furthermore, the use of averages allowed the impact of papers in multiple categories to be reflected in the score for each paper, the Category Specific RBI and its average.

The test used here is a non-parametric and assesses the difference between the papers in different categories (defined in the question) in terms of the ranks of papers in each category. Ranking of papers is based on the average Category Specific RBI for all of the papers in an award; this can include single or multiple papers, and single or multiple papers appearing under more than one journal category.

The issues which were examined within this aspect of the Study were sought to examine issues raised in the research collaboration literature between the impact of papers and the following:

- Whether there was international collaboration in the production of papers
- Whether there was new international collaboration
- Whether there was intercontinental collaboration
- The number of collaborators
- The number of countries involved in collaboration
- Awardees' previous experience of international collaboration
- Involvement of previous collaborators
- Awardees' previous experience of interdisciplinary collaboration
- Awardees' previous change of discipline
- Awardees' previous change of research area
- Belief about whether the research could have been done in only one country

3.6.1 International Collaboration and Impact of Papers Produced Under the Award

A question concerning whether the award (the LTF) involved international collaboration was given in the on line questionnaire and where there were response and it was possible to link to publication data, a table of papers in each category was prepared. The difference in the mean ranks of the papers is not sufficient to suggest any statistically significant difference between papers that involved international collaboration and those that did not.

Table 90 International Collaboration and Impact

Ranks			
	International Collaboration	N	Mean Rank
Cat_Spec_RBI	Non	56	85.09
	Yes	120	90.09
	Total	176	

Table 91 Chi-Square Statistic

Test Statistics^{a,b}	
	Cat_Spec_RBI
Chi-Square	.368
df	1
Asymp. Sig.	.544
a. Kruskal Wallis Test	
b. Grouping Variable: International_Collaboration	

3.6.2 New International Collaboration and Impact of Award Papers

The link between new international collaboration undertaken by the awardee in the course of the award and the impact of the papers arising from research award was examined by grouping answers and average paper quality as in the table below. Clearly, new collaboration predominated in the work done by LTF awardees, but there is no significant difference between the papers in each category. Apparently, whether the award involved new international collaboration or not, there is no link to the average quality of the papers resulting.

Table 92 New International Collaboration

Ranks			
	New_International_Collaboration	N	Mean Rank
Cat_Spec_RBI	No, but Desirable	12	59.92
	No, No Need Felt	17	65.88
	Yes	91	59.57
	Total	120	

Table 93 Chi-Square Statistic

Test Statistics^{a,b}	
	Cat_Spec_RBI
Chi-Square	.475
df	2
Asymp. Sig.	.788
a. Kruskal Wallis Test	
b. Grouping Variable: New_International_Collaboration	

3.6.3 Intercontinental Papers and Paper Impact

A similar comparison was carried out, with a smaller number (74) indicating that intercontinental collaboration took place than (91) indicating that international collaboration took place (see previous tables). There is again no apparent difference between the two sets of papers.

Table 94 Intercontinental Collaboration

Ranks			
	Intercontinental_Collaboration	N	Mean Rank
Cat_Spec_RBI	No	17	40.65
	Yes	74	47.23
	Total	91	

Table 95 Chi-Square Statistic

Test Statistics^{a,b}	
	Cat_Spec_RBI
Chi-Square	.859
df	1
Asymp. Sig.	.354
a. Kruskal Wallis Test	
b. Grouping Variable: Intercontinental Collaboration	

3.6.4 Paper Impact and Number of Collaborators

The papers produced by awardees were then grouped according to the number of the collaborators involved in the project and the test of ranks was carried out. The number of collaborators was not found to be related to the impact of papers.

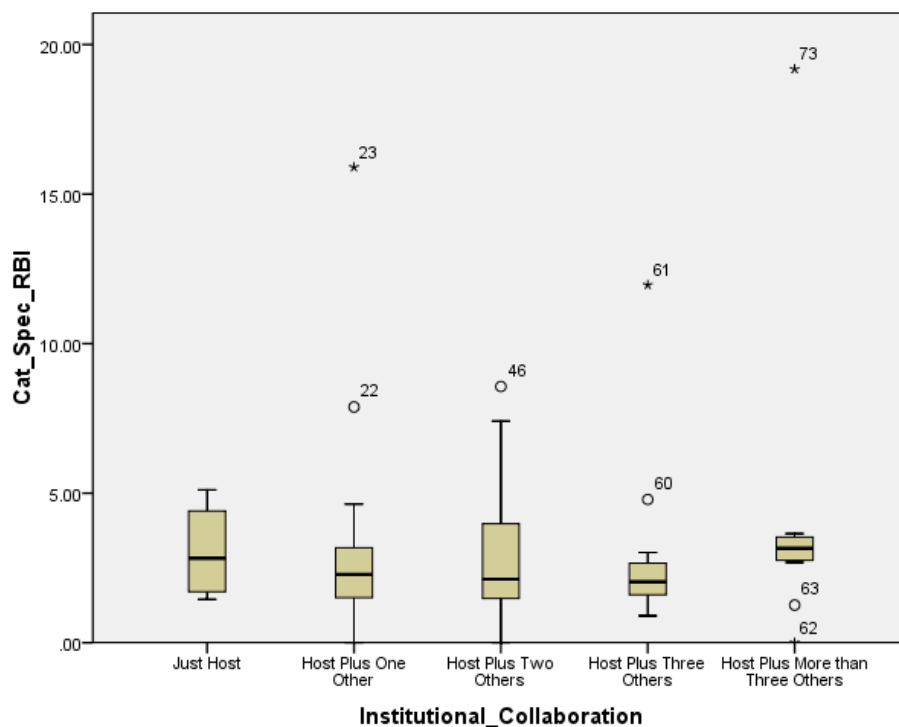
Table 96 Institutional Collaboration

Ranks			
	Institutional_Collaboration	N	Mean Rank
Cat_Spec_RBI	Just Host	4	42.25
	Host Plus One Other	19	34.29
	Host Plus Two Others	23	37.17
	Host Plus Three Others	15	32.20
	Host Plus More than Three Others	12	45.21
	Total	73	

Table 97 Chi-Square Statistic

Test Statistics^{a,b}	
	Cat_Spec_RBI
Chi-Square	3.121
df	4
Asymp. Sig.	.538
a. Kruskal Wallis Test	
b. Grouping Variable: Institutional_Collaboration	

Figure 34 Box Plot Numbers of Institutions and Average Impact of Papers (Cat_Spec_RBI)



3.6.5 Number of Countries Involved and Publication Impact

Papers were then split according to the number of countries which the respondents reported were involved in the award. No significant difference was found between papers arising under the three types of conditions noted below: a) where there were either one or two countries, b) where there were between 3 and 5 countries involved, c) and where there were more than 5 countries involved. The test shows that the number of countries involved in the project has not influenced the average impact of the papers that result.

Table 98 Number of Countries

Ranks			
	Number_of_Countries	N	Mean Rank
Cat_Spec_RBI	Below 3	44	39.34
	3 to 5 Countries	25	33.06
	More than 5	4	35.88
	Total	73	

Table 99 Chi-Square Statistic

Test Statistics ^{a,b}	
	Cat_Spec_RBI
Chi-Square	1.409
df	2
Asymp. Sig.	.494
a. Kruskal Wallis Test	
b. Grouping Variable: Number_of_Countries	

3.6.6 Previous Experience of Collaboration Internationally and Impact of LTF Papers

Papers were also grouped according to whether the respondent had previous experience of collaboration internationally. The sets of respondents in each category were similar. There was no difference noted between the two sets of respondents in the quality they achieved.

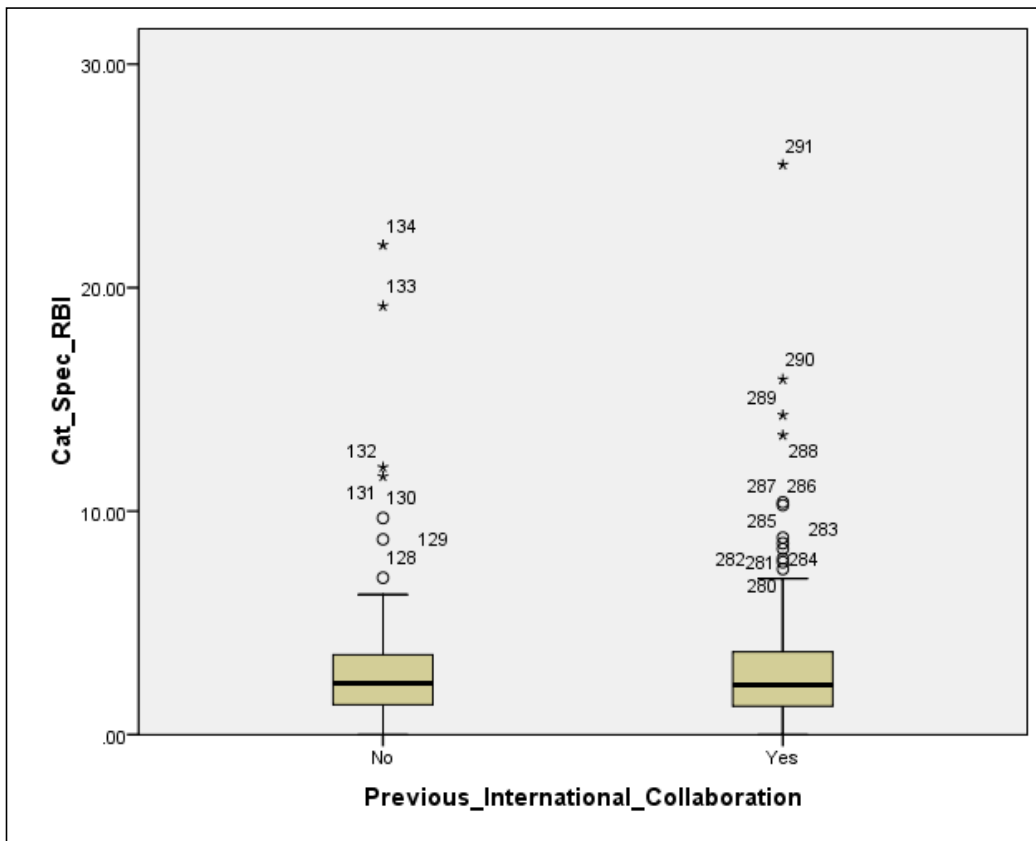
Table 100 Previous International Collaboration

Ranks			
	Previous_International_Collaboration	N	Mean Rank
Cat_Spec_RBI	No	134	145.57
	Yes	157	146.36
	Total	291	

Table 101 Chi-Square Statistic

Test Statistics ^{a,b}	
	Cat_Spec_RBI
Chi-Square	.006
	1
Asymp. Sig.	.936
a. Kruskal Wallis Test	
b. Grouping Variable: Previous_International_Collaboration	

Figure 35 Influence of Previous International Collaboration on Impact of HFSPo Project



3.6.7 Previous Collaborators Influence on Impact

The involvement of previous collaborators in HFSPo awards was examined. Previous collaborators were involved in 29 cases out of the set of 155 for which responses were given. While the mean rank of papers with no previous collaborator was higher, there is no significant difference between the sets of papers.

Table 102 Previous Collaborators

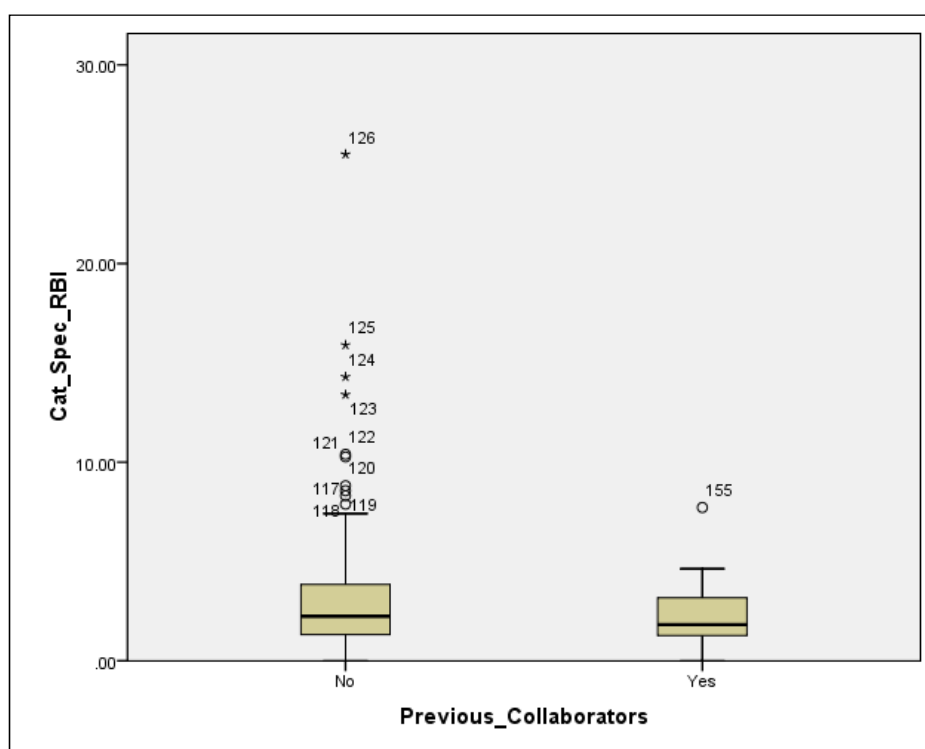
Ranks			
	Previous_Collaborators	N	Mean Rank
Cat_Spec_RBI	No	126	79.98
	Yes	29	69.38
	Total	155	

Table 103 Chi-Square Test

Test Statistics ^{a,b}	
	Cat_Spec_RBI
Chi-Square	1.316
df	1
Asymp. Sig.	.251
a. Kruskal Wallis Test	
b. Grouping Variable: Previous_Collaborators	

The graph indicates that average values of each set of papers are close but there appears to be a greater spread of values of impact amongst the set of papers that were produced with those with whom there had not been previous collaboration.

Figure 36 Involvement of Previous Collaborators and Influence on HFSPo Funded Research



3.6.8 Previous Interdisciplinary Collaboration

Papers were then split by whether the award under which they had been produced had been carried out by an award holder who had had previous interdisciplinary collaboration. No statistically significant difference was noted between these two groups of papers; a similar trend for some higher values among the group without previous interdisciplinary collaboration can be seen in the figure, but, taken when groups are considered, there is no significant difference.

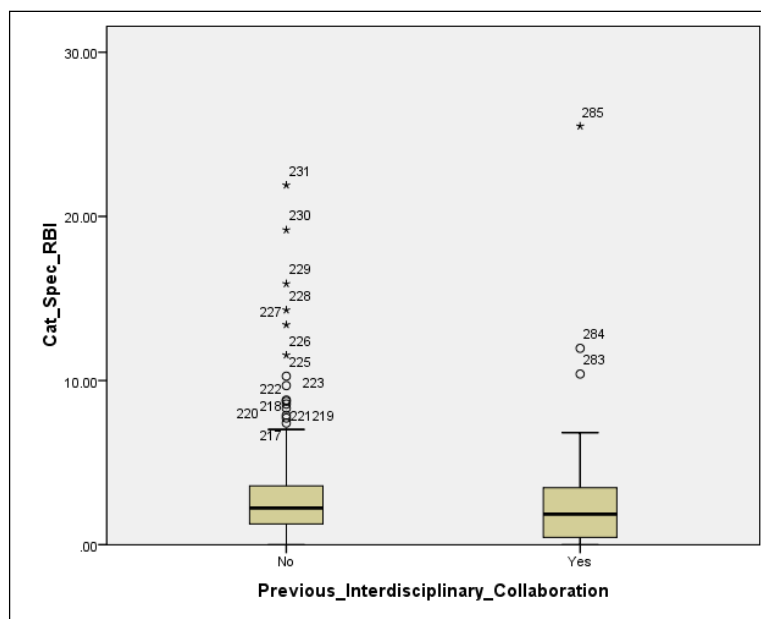
Table 104 Previous Interdisciplinary Collaboration

Ranks			
	Previous_Interdisciplinary_Collaboration	N	Mean Rank
Cat_Spec_RBI	No	231	153.05
	Yes	66	134.82
	Total	297	

Table 105 Chi-Square Statistic

Test Statistics ^{a,b}	
	Cat_Spec_RBI
Chi-Square	2.316
df	1
Asymp. Sig.	.128
a. Kruskal Wallis Test	
b. Grouping Variable: Previous_Interdisciplinary_Collaboration	

Figure 37 Previous Interdisciplinary Collaboration and Influence on Impact of HPSO Publications



3.6.9 Previous Change of Discipline and Impact

Papers were split into groups according to whether the awardee had previously changed discipline. This test showed that those who had NOT changed discipline previously had papers (HFSP papers) that exceeded the impact or quality of those who had changed discipline. This is the single significant test in this series. Change of discipline, amongst awardees of the LTF, correlates with higher publication quality.

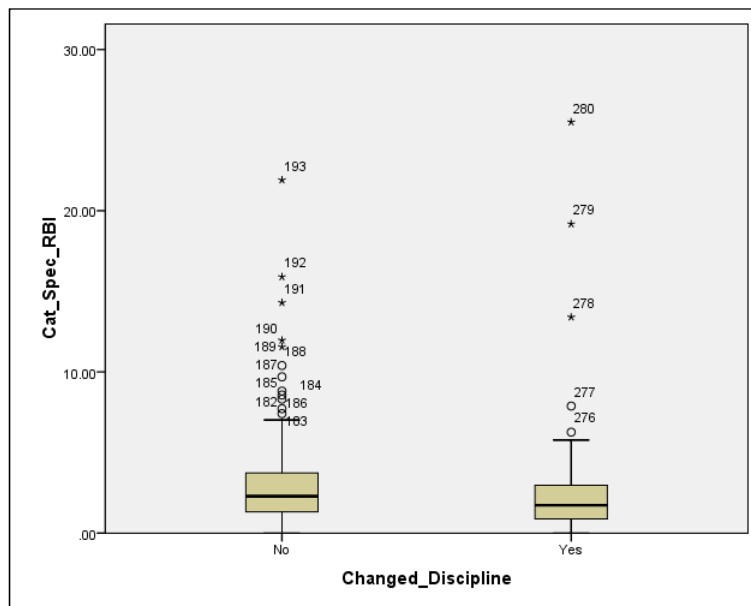
Table 106 Changed Discipline

Ranks			
	Changed Discipline	N	Mean Rank
Cat_Spec_RBI	No	193	160.82
	Yes	104	127.07
	Total	297	

Table 107 Chi-Square Statistic

Test Statistics ^{a,b}	
	Cat_Spec_RBI
Chi-Square	10.450
Df	1
Asymp. Sig.	.001
a. Kruskal Wallis Test	
b. Grouping Variable: Changed Discipline	

Figure 38 Effect of Changing Discipline on Impact of Papers



3.6.10 Change of Research Area and Influence on Impact

While the previous comparison elicited a significant result, the comparison of papers of awardees that had previously changed / not changed research area did not.

Table 108 Change of Research Area

Ranks			
	Changed_Research_Area	N	Mean Rank
Cat_Spec_RBI	No	93	155.56
	Yes	204	146.01
	Total	297	

Table 109 Chi-Square Statistic

Test Statistics ^{a,b}	
	Cat_Spec_RBI
Chi-Square	.792
df	1
Asymp. Sig.	.374
a. Kruskal Wallis Test	
b. Grouping Variable: Changed_Research_Area	

3.6.11 Could Research have been done in only one Country

Potential respondents were asked if they thought the research they had done could have been done in just one country. A number (N=123, whose publications were available in the analysis) thought that they could have done. The average RBI impacts of the publications of this group were then considered and while their publications appeared to have a slightly higher impact with a higher mean rank, this difference is not statistically significant.

A lower value might have suggested – had it been significant – that those who thought the research could have been done in one country were concluding from their own experience that the use of research institutes from more than one country could have reduced the quality of their own research.

Table 110 Research in One Country

Ranks			
	Research_Only_One_Country_Bivariate	N	Mean Rank
Cat_Spec_RBI	No	32	68.84
	Yes	123	80.38
	Total	155	

Table 111 Chi-Square Statistic

Test Statistics ^{a,b}	
	Cat_Spec_RBI
Chi-Square	1.678
df	1
Asymp. Sig.	.195
a. Kruskal Wallis Test	
b.	Grouping Variable: Research_Only_One_Country_Bivariate

3.6.12 Concluding Remarks

The foregoing tests were carried out to establish the effect, if any, of a number of known influencing factors on the quality of the outputs of the research funded under the LTF programme. The publications used in the analysis are of varying although most of high or very high quality (thereby creating opportunities to establish differences between schemes). The direction of these effects is not always evident however, with increasing levels of country involvement often leading to greater impact to some level, but also involving greater costs. The tests carried out sought to establish if there were clear influencing factors on the output quality of the research carried out by the LTFs so that action could be taken by the HFSP to alter aspects of their schemes. The absence of statistical significance to these tests suggests that the factors outlined are not influencing quality. In our view it is likely that the tests show that the projects are well managed, and that the difficulties, which do affect organisations and researchers of lesser quality, are not occurring here or are being very effectively surmounted.

There is one area where significant differences are found. When a LTF award holder has previously changed discipline (but not research area), publications within the LTF arising from the award in the sample of publications we have are of lower quality. If the researcher has not changed discipline therefore prior to the HFSP award, their publications in the HFSP award are of higher quality. Why does such an effect come into being? Could such a piece of information be used to select awardees? At present, the process of causation here is unknown.

3.7 Review of Collaboration, Interdisciplinarity and Impact / Quality

This section of the report examines the related issues of collaboration, interdisciplinarity, and scientific impact or quality. Understanding of how these three issues interrelate is central to delivering science of the highest quality, to supporting the best forms of research, including interdisciplinarity, and to designing appropriate mechanisms to support scientific collaboration, all matters of central importance to HFSP. Data provided by Evidence from the Web of Science (the publication data set) has been further analysed here to examine interdisciplinarity.

3.7.1 Interdisciplinarity within the HFSP0 Papers

Within the publications database supplied by the WOS, for each paper there is a count of the number of journal categories with which it is associated. We have assumed for the purpose of creating a workable data set that papers with one category are assumed to be mono-disciplinary, while papers which are associated with more than one journal category are assumed to be interdisciplinary in some sense (multi-disciplinary, trans-disciplinary, etc (for a recent review of classifications in this area, see Huutoniemi et al, 2010).

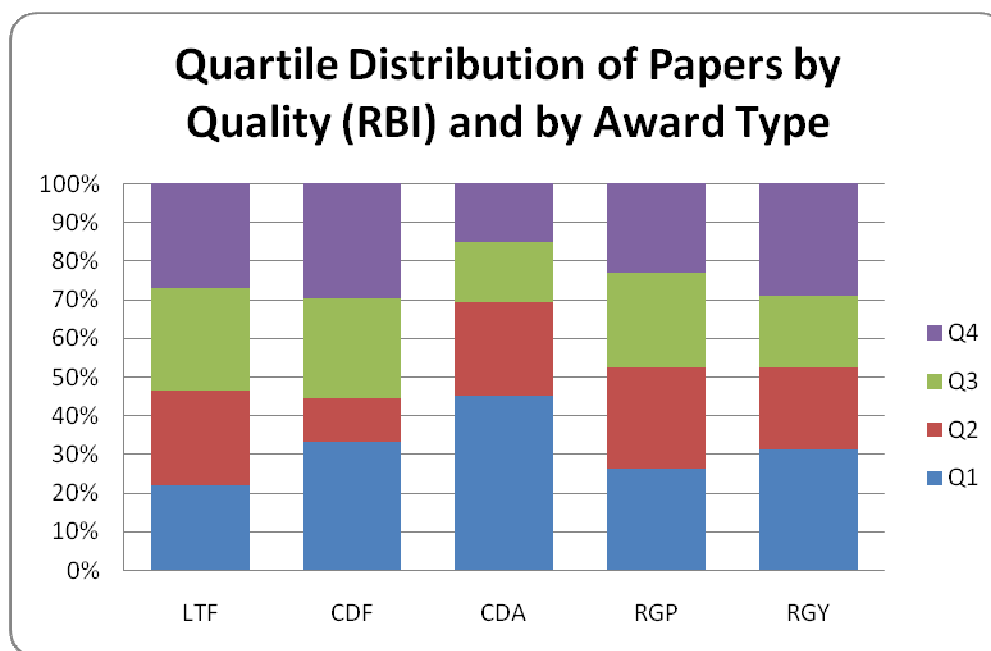
Papers are assigned to quartiles across the whole dataset of papers (we used the 7027 papers and this takes the unique papers of the data set as body of work within which comparisons are made. For each paper, the distribution of rebased impact factor (RBI), a ratio quantity is used as the measure of quality and impact. Methods from non-parametric statistics are used in preference to those which make assumptions about underlying assumptions. Papers are then split into quartiles across the whole HFSP0 database of papers. The quartile distributions are then presented, cross classified firstly by award type and then by the number of categories used (i.e. the level of interdisciplinarity).

Table 112 Quartile Distribution of Papers by Impact (RBI) and by Award Type

Quartile * Award Type Cross tabulation								
			Award Type					
			CDA	CDF	LTF	RGP	RGY	Total
Quartile	1	Count	158	12	803	974	150	2097
		Expected Count	82.8	7.5	919.3	963.8	123.6	2097.0
	2	Count	77	3	889	995	104	2068
		Expected Count	81.7	7.4	906.6	950.5	121.9	2068.0
	3	Count	50	7	987	985	100	2129
		Expected Count	84.1	7.6	933.3	978.5	125.5	2129.0
	4	Count	46	8	996	899	140	2089
		Expected Count	82.5	7.5	915.8	960.1	123.1	2089.0
	Total	Count	331	30	3675	3853	494	8383
		Expected Count	331.0	30.0	3675.0	3853.0	494.0	8383.0

The quartile distribution of papers by rebased impact (RBI) shows that all forms of grant have papers in each quartile. The distribution of papers within the quartiles and by research award type is not uniform (or expected) as seen within a Chi-square test. A table showing the individual Chi-Square values shows the extent to which the column values vary from expected.

Figure 39 Quartile Distribution of Papers by Quality (RBI) and by Award Type



High values are found in the cells which are emboldened. A cut off of 4.00 is used to indicate the very significant deviations from expected. Where the observed values are higher than expected there are no brackets round the emboldened type; where the observed values are lower than expected, brackets are placed round the emboldened type.

The interpretation of the following table (which can also be gained from the figure shown immediately above) is that the LTF has a lower than expected number of papers in the lowest quartile (1st quartile) while it has a higher than expected number of papers in the highest quartile (4th quartile) i.e. top quality papers. The CDF is typical of the whole data set. The CDA has a higher number of lower quality papers than expected (in terms of the comparison with the other papers in the HFSP0 data set), while same award has a lower than expected number of papers in the top (4th quartile). The RGP is mostly typical of the whole data set across the quartiles, but its papers in the fourth quartile are more numerous than expected, giving rise to a higher number in this box (4.32). Young Investigator Grants are more numerous in the bottom quartiles and the third quartile. These values for observed and expected should not be confused with counts and they are created from row and column totals also.

Table 113 Chi-Square Distribution Table – Quartile Distribution of Papers by Quality (RBI) and by Award Type

Award	Quartile			
	Q1	Q2	Q3	Q4
CDA	68.30	0.27	13.80	16.14
CDF	2.69	2.62	0.05	0.04
LTF	14.71	0.34	3.09	7.03
RGP	0.11	2.08	0.04	3.89
RGY	5.65	2.62	5.17	2.32

3.8 Examining Interdisciplinarity and Impact

Analysis of interdisciplinary and impact measured as the average RBI per paper has been carried out by cross classifying papers with categories. The following table gives this information with the number of papers shown by category and quartile. Below the table of frequencies is a table of Chi-Square values that indicates where the differences between expected and actual counts occur.

Table 114 Quartile Distribution of Papers by Quality (RBI) and by Extent of Interdisciplinarity

Quartile		Categories						Total
		1	2	3	4	5	6	
1	Count	1291	563	185	53	0	5	2097
	Expected Count	1342.0	540.1	184.1	27.3	.3	3.3	2097.0
2	Count	1293	574	168	29	0	4	2068
	Expected Count	1323.5	532.6	181.6	26.9	.2	3.2	2068.0
3	Count	1350	544	214	17	1	3	2129
	Expected Count	1362.5	548.3	186.9	27.7	.3	3.3	2129.0
4	Count	1431	478	169	10	0	1	2089
	Expected Count	1336.9	538.0	183.4	27.2	.2	3.2	2089.0
Total	Count	5365	2159	736	109	1	13	8383
	Expected Count	5365.0	2159.0	736.0	109.0	1.0	13.0	8383.0

Table 115 Chi-Square Statistic from the Quartile Distribution of Papers by Quality (RBI) and Extent of Interdisciplinary (Up to and including Cat 4 Papers)

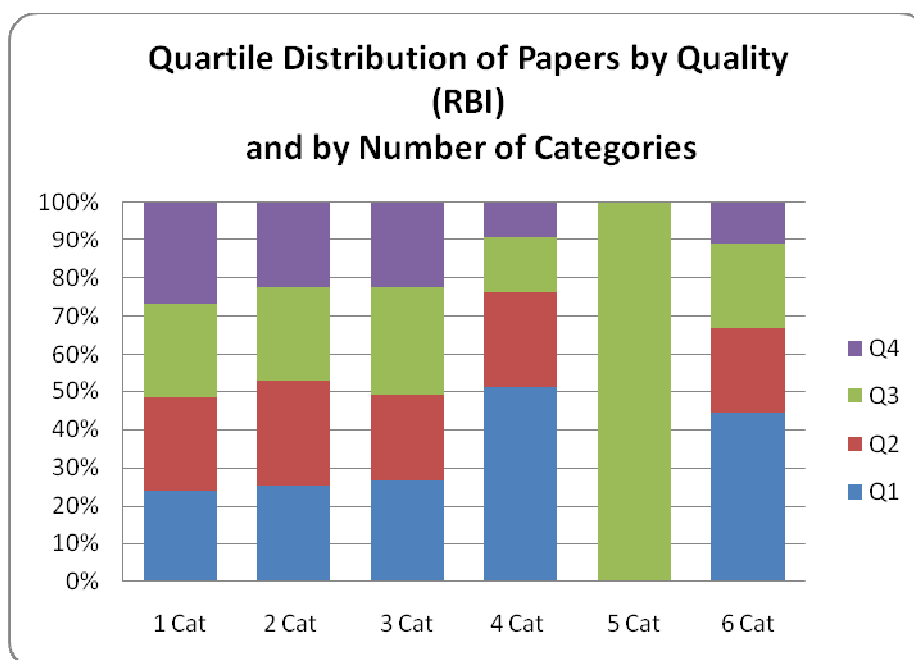
Category	Quartile			
	1	2	3	4
1	1.87	0.69	0.12	6.48
2	1.01	3.24	0.04	6.78
3	0.01	1.01	3.91	1.15
4	24.34	0.17	4.13	10.86
5	0.25	0.25	2.19	0.25
6	0.94	0.20	0.03	1.55

Table 116 Chi-Square Statistic

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	71.438 ^a	15	.000
Likelihood Ratio	70.459	15	.000
Linear-by-Linear Association	27.877	1	.000
N of Valid Cases	8383		

a. 8 cells (33.3%) have expected count less than 5. The minimum expected count is .25.

Figure 40 Quartile Distribution of Papers by Quality (RBI) and by Number of Categories



3.8.1 Mono-and Multi-disciplinary Comparisons

Comparison of papers that are under a single category and all other papers can be considered as a comparison of disciplinary and interdisciplinarity research. Such comparisons can be undertaken at the level of quality, as we have done below, using the quartile distributions.

Table 117 Mono and Multi-disciplinary Comparison – Quartile Distribution

Quartile		Mono_Multi_Disciplinary		
		Mono-Disciplinary	Multi-Disciplinary	Total
1	Count	1291	806	2097
	Expected Count	1342.0	755.0	2097.0
2	Count	1293	775	2068
	Expected Count	1323.5	744.5	2068.0
3	Count	1350	779	2129
	Expected Count	1362.5	766.5	2129.0
4	Count	1431	658	2089
	Expected Count	1336.9	752.1	2089.0
Total	Count	5365	3018	8383
	Expected Count	5365.0	3018.0	8383.0

The Chi-Square statistic shows that the distribution of papers by quartile between mono and multidisciplinary forms is not as expected.

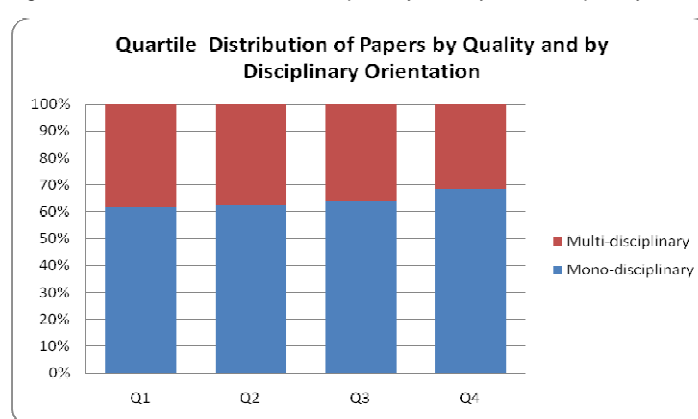
Table 118 Chi-Square Statistic

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.050 ^a	3	.000
Likelihood Ratio	26.362	3	.000
Linear-by-Linear Association	21.299	1	.000
N of Valid Cases	8383		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 744.51.

As can be seen below, with ascending quartile, the number of mono-disciplinary papers increases above the level expected, while the number of interdisciplinary papers falls.

Figure 41 Quartile Distribution of Papers by Quality and Disciplinary Focus



The differences that produce this rising trend are statistically significant although they do not appear large in absolute terms.

3.8.2 Distribution by Award Type and Disciplinary Focus

Papers are then allocated by award type and by mono – multi disciplinary split. Papers are not distributed evenly as the Chi-Square statistic is significant, but the actual differences are small.

Table 119 Distribution of Papers by Award Type and Disciplinary Focus

Award Type		Mono-Disciplinary	Multi-Disciplinary	Total
CDA	Count	187	144	331
	<i>Expected Count</i>	211	119	331
CDF	Count	22	8	30
	<i>Expected Count</i>	19	10	30
LTF	Count	2379	1296	3675
	<i>Expected Count</i>	2351	1323	3675
RGP	Count	2461	1392	3853
	<i>Expected Count</i>	2465	1387	3853
RGY	Count	316	178	494
	<i>Expected Count</i>	316.2	177	494
Total	Count	5365	3018	8383
	<i>Expected Count</i>	5365	3018	8383

Award Type		Mono-Disciplinary	Multi-Disciplinary	Total
CDA	Count	187	144	331
	<i>Expected Count</i>	211	119	331
CDF	Count	22	8	30
	<i>Expected Count</i>	19	10	30
LTF	Count	2379	1296	3675
	<i>Expected Count</i>	2351	1323	3675
RGP	Count	2461	1392	3853
	<i>Expected Count</i>	2465	1387	3853
RGY	Count	316	178	494
	<i>Expected Count</i>	316.2	177	494
Total	Count	5365	3018	8383

The award which is most typical of the whole set of papers in terms of their split of papers between mono and multi disciplinary areas is the RGY. CDAs are least typical as is shown below. Monodisciplinary papers are less common than might be expected while multidisciplinary papers are more common.

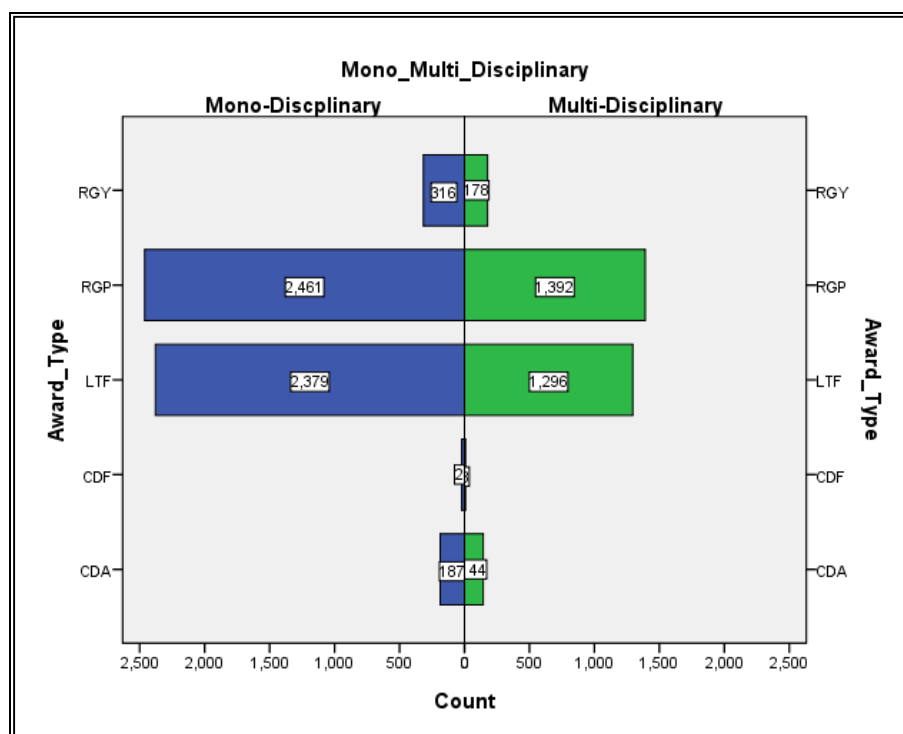
Table 120 Chi-Square Test Result

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.113 ^a	4	.039
Likelihood Ratio	9.965	4	.041
N of Valid Cases	8383		
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.80.			

Table 121 Chi-Square Values by Cell

Disciplinary Focus	Chi-Square Values				
	Award Type				
	CDA	CDF	LTF	RGP	RGY
Mono-Disciplinary	(2.91)	0.41	0.31	0.01	0.00
Multi-Disciplinary	5.18	0.73	0.55	0.02	0.00

Figure 42 Mono-Multidisciplinary Split by Award Type



3.8.3 Statistics on Impact and Interdisciplinarity – Major Award Types

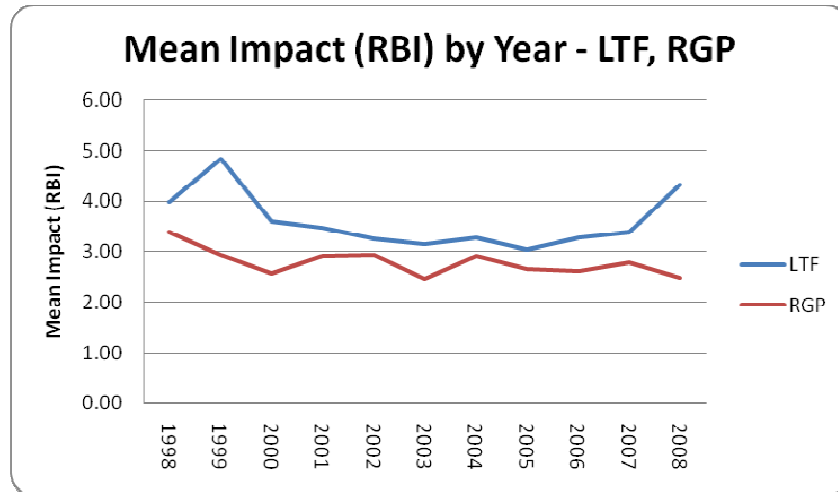
The following data uses average values of quality per paper over whole award types on an annual basis and average values of categories per paper over whole award types, again on an annual basis. The purpose of this analysis is to note differences in quality and interdisciplinarity over time and to find evidence of variability in quality and in interdisciplinarity activity as this might reveal the effect of policy and programme changes. The two largest awards have been examined as there is a long run of data on their performance.

Table 122 Year on Year Changes in Quality, Categories and Variability of Quality and Categories, LTF and RGP

	Mean Quality		Mean Categories	
	LTF	RGP	LTF	RGP
1998	3.99	3.39	1.64	1.42
1999	4.83	2.94	1.39	1.38
2000	3.60	2.58	1.46	1.53
2001	3.46	2.91	1.40	1.56
2002	3.26	2.94	1.45	1.47
2003	3.15	2.46	1.45	1.56
2004	3.28	2.92	1.45	1.46
2005	3.05	2.66	1.47	1.59
2006	3.27	2.61	1.40	1.48
2007	3.39	2.79	1.54	1.51
2008	4.33	2.49	1.48	1.60

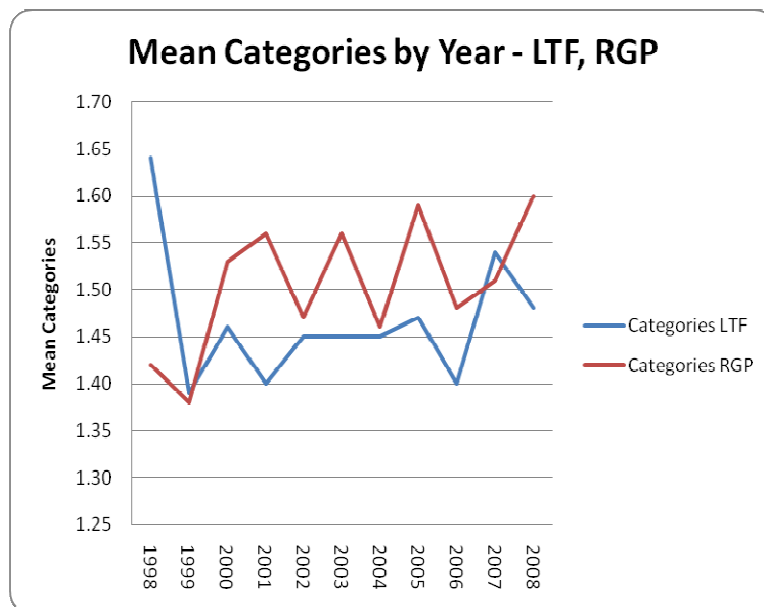
The data in the first two columns is shown in the table immediately following. Average impact for the papers of the LTF programme is higher year by year over the last decade than for the RGP.

Figure 43 Mean Impact (RBI) by Year – LTF, RGP



The RGP is as noted below, the more interdisciplinary set of papers. In 2007, LTF papers had on average more categories (were more interdisciplinary) than RGP. The trend for both LTF papers and RGP papers is to have more categories over time.

Figure 44 Mean Categories per Paper by Year – LTF, RGP



4 Synthesis, Conclusions and Recommendations

The HFSP provides a unique set of programmes, with a sui generis combination of excellence, high risk, inter- and cross-disciplinarity and a consequent global outreach. The programmes are designed to complement each other, to support individuals, teams and – indirectly – organisations. At the same time the HFSP is well aware of the structural effects of the programmes in terms of mobility and build up of excellence in national research systems. It thus also strives for a balanced mobility pattern of the awardees without in any way compromising excellence. All in all, the scientific excellence as measured through bibliometric analysis and the impacts on careers and organisations as analysed in the surveys are highly impressive, and the prestige of the programme appears unique.

In sum, the HFSP programmes contribute to research and capacity building in life sciences in a crucial way. In their unique combination they constitute an opportunity structure for research in life science, whereby risk-taking, mobility, collaboration is enabled that follows the need of that field and the desires of individuals. It thus complements national and other supranational schemes that, one way or the other, are more limited than the offering of the HFSP. Despite a set of potential improvements and despite the continuous challenges of inter- and cross-disciplinary research and collaboration for individuals and institutes, the HFSP schemes are a functional cornerstone of the global research funding landscape that attracts and breeds excellence at the highest level – and at the same time allows for an in-built application relevance of research.

The programme and the organisation are extremely well regarded in the funded community which was at the centre of this evaluation. By and large, all programmes do what they intend to do. In addition, although the management of the programme was not in the focus of the evaluation, all indications we have about the management point towards excellence and a very high level of user-friendliness. The feedback in open text fields and in interviews about the HFSP is overwhelmingly positive.

The profiles, impacts and strengths of the individual programmes which are summarised in the executive summary, do not need repetition here. The programmatic innovations, such as the CDF and (earlier) the CDA and YIG, are challenging, but work. The broadening of programmes has accentuated the profile of the HFSP even further, rather than softened it. In all schemes the overriding principles of the HFSP are present, and the effects on excellence, international collaboration and high risk research apparent. The CDF allows even more radical change and linkage of fields and disciplines and appears to achieve this even beyond the funded period. The CDA scheme has been widely accepted and become a cornerstone and catalyst in “HFSP careers”. It appears that in some cases it is a challenge to find appropriate organisational hosts and institutional framework conditions for all potential CDA awardees to go to their home country as defined in the scheme and build up careers in their niches. The Young Investigator Grant is a success, especially as regards the opportunity for an accelerated build up of international visibility and collaboration on highest levels. It is not intended to be comparable to the ERC starting grants which open up a new dimension of grant in terms of funding.

Against this background of overall excellence, additionality and effectiveness, some recommendations emerge out of the data analysis and the interviews of awardees and the analysis of a set of other organisations:

- 1) The HFSP programmes should remain risk taking and truly global, and thus continue to strengthen their unique profile. After two decades of operation, the consequent international approach and the opportunity to link knowledge areas in novel ways is still

avant-garde, as all funding programmes search for ways to “globalise” somehow and to open up to inter-disciplinarity.

- 2) The programmes should thus continue to provide the conditions under which high risk and inter-disciplinarity can flourish.
- 3) In general, this includes that there should be no trading of numbers for duration in the fellowship scheme, the three years offered for complex and risk taking research appears appropriate. However, the development of the CDF programme should be further monitored. More than LTF fellows who change areas within life science, CDF fellows have the inherent problem of gaps in producing publication and finding networks within new areas. From the interviews and the survey it appears that for the CDF even the generous three years duration is challenging given the high transaction cost of the transition. In most cases, it appears, the fellows find funding one way or the other, often they are employed by the host to finalise a research project. However, for exceptional cases, flexible solutions for extensions might be contemplated, maybe as co-funding with the host organisation or fellow in a fourth, transitional year that would have to be well argued by the fellow and the host organisation.
- 4) Further, especially the transition process in CDF and CDA could be supported by voluntary mentoring schemes, whereby a network of volunteers / alumni are ready to support young researchers who take risk and struggle to find their position in their new areas.
- 5) The CDA scheme shows some challenges: it produces slightly lower quality in terms of publications (whereby the standing of the awardee, on the other hand, is increased through building up a team and visibility). The duration of the CDA is an issue, as it takes an enormous time to build up a team and the necessary stability for it to work properly. Further, it seems to take some CDA awardees considerable time to convince host organisations that the award is an individual one and the team-building and leadership is with the awardee. This challenge is different in different countries. The recommendation is to further accentuate vis-à-vis the host organisation the intended “ownership” of the CDA and to provide mentoring support and guidance in situations in which the national or institutional regulation make it difficult for awardees to decide autonomously on personnel matters. Further, more case-by-case flexibility as for the duration of the CDA may be envisaged.
- 6) Both the fellowships and the CDA have a structural element, the repatriation to home countries. The CDA requires awardees to go back to the home country rather than staying in the host country or returning to the PHD country (as EMBO does). As such it is an explicit structure building tool. However, in the case of the LTF the data shows that fellows from emerging countries do not take it up in a meaningful way. Equally, indications from interviews with CDAs show that due to the home country principle as defined in the HFSP, there is an in-built disadvantage for awardees stemming from countries with weaker infrastructures. As the goal is both individual and institutional (structure in home countries), for the CDA this may occasionally lead to tough decisions and to the search for a second best option in order to fulfil the criteria. This is an in-built tension for which no easy solution can be found as long as the structural effect is at stake. To recommend on the policy and political trade-off between abandoning the home country rule and opening it up is beyond this report, but it is important to point towards the problem.
- 7) Across all schemes there appears to be a readiness for community building and further networking within the HFSP. While the HFSP secretariat should not act as pro-active

team-builder (for many reasons), it could even intensify networking activities around the HFSP. The annual conference has been praised for providing the necessary platforms, but more fora and opportunities might be useful, especially as the HFSP community shares the experience of high-risk, trans-disciplinary research. All this should also include alumni, even if the focus will be with current awardees.

- 8) Related to this, as mentioned above already, the HFSP could discuss the idea of having voluntary mentors especially for cases of serious change of research focus or discipline. Those mentors could support the integration into networks beyond the actual host supervisors (who often themselves are not fully linked to the relevant but network) and give advice as to how best translate the learning into publications.

Annexes

Annex 1 – Case Study Summaries

This annex presents the characterisation of nine case study interviews, the results of which are integrated throughout the report. The cases are labelled according to the latest award, as some (CDA in particular) have more than one award.

CROSS DISCIPLINARY FELLOWSHIPS

CDF Case Awardee 1

The awardee is Israeli and began her CDF in 2005. Prior to receiving the HFSP award she had received Rothschild Fellowship funding for one year. She thought the HFSP research funding was very generous and was particularly grateful for childcare and spousal support. The award has significantly enhanced both her ability to work as an independent innovative scientist and increase the number of her international collaborators. She has experienced a slower rate of publication of empirical results as a by-product of the change in disciplines but has published theoretical and review papers about her new field during this time so she does not have a five year gap in her publication record. Since completion of the award she has remained in the host country employed at the same lab for the last two years. During this time she has completed aspects of her original research. Since she is not an American citizen most of the NIH funding opportunities were not available to her. The only NIH fund that was relevant was K-9929. However, they require preliminary published results and at the time she did not have that so it wasn't relevant to her. She is currently undecided as to whether she will return to the home country citing differences in the quality of the scientific environment and opportunities for innovative science. Her old discipline has actually been very helpful, especially regarding papers. She is using mathematical modelling (ordinary differential equations) to analyze and deepen the understanding of the dynamics of gene regulatory circuits that she studies experimentally. She has already published a paper about it and has just received the reviews of a second paper she wrote independently of her host. With some more work, this paper will hopefully be published soon. In the experimental paper just recently submitted, she has used the mathematical model to explain her experimental results.

CDF Case Awardee 2

The awardee is from Israel. His CDF award began in 2006 and since completion he has been employed at the host university. He did not investigate alternative funding prior to the HFSP award although he was aware of EMBO as he considers the HFSP to be unique in funding cross-disciplinary research. Without the HFSP award he would not have been able to have made the change from physical chemistry to biophysics. He was of the view that the duration of the award should be extended to 5 years as the difficulties of developing successfully in the new field were very significant. His publication rate had been slower but nonetheless he had published a major paper in his new field. He felt that the pressure to publish is always significant and believes he received advice that to have published his paper slightly later might have led his paper to have had a warmer reception. In his view changing disciplines gives only minor problems about international/intercontinental collaboration and in his case, it has actually

²⁹ NIH K-99 The Pathway to Independence Award Program is designed to facilitate the rapid transition of the most promising and exceptionally talented new investigators into independent research careers. The Award seeks to attract the best and brightest individuals conducting research in the United States, regardless of citizenship. This support should help transition them to research independence here in the U.S. <http://grants.nih.gov/grants/guide/pa-files/pa-10-063.html>

helped him. He said he has made a lot of new friends in the scientific community and that “had opened my eyes” to new environments. He felt that being in the States had done this – because there is more exposure, more dynamism in the scientific community, all the important conferences take place there compared to Israel and Europe. In Israel and Europe there is high end excellent science but not on the scale of the US. His old discipline is part and parcel of his new discipline. It is the core of his approach in his new work. He utilises tools from before - mathematical modelling, instrumentation, sample preparation , et al. There are downsides, of course because he has to unlearn the reductionism of his old disciplinary approaches. The yearly meetings and networking that HFSP offered has improved his capacity for international collaboration. Currently he is considering his position as to whether he returns to his home country. He has been offered his own labs in both the home and host country. He said his eventual decision as to whether he returns to his home country will be based less on the science opportunities, which are first class in both countries, but on quality of life issues for his family.

LONG TERM FELLOWSHIPS

LTF Case Awardee 1

LTF Case 1 completed a PhD in EMBO, Heidelberg, moving to the Friedrich Miescher Institute for Biomedical Research in Basel where she then received EMBO post-doctoral fellowship, and thereafter an HFSP LTF award. The overall opinion about the LTF scheme is very positive, highlighting that the HFSP has a very good understanding of the needs of the researchers. Importantly, HFSP was very good financially, compared with other schemes such as EMBO and, even though, in her case, the Institute tops up the salaries (having an awardee with a higher grant was an advantage for the institute). HFSP is also very generous in terms of money for travel and other research expenses (conferences, training courses, language training for the first year that could be extended to following years – very important for the integration within the research group). HFSP provided the necessary means to adjust to a new discipline, in particular through the option of having a second advisor. In this particular case, during the first year of HFSP the LTF established collaboration with another research group in the US, where she had the opportunity to go for 6 months. HFSP was very positive about this and supported her. In comparison with HFSP, EMBO encouraged mobility but interdisciplinarity was not a necessary requirement whereas for HFSP it was. EMBO offered several courses for fellows, although it did not provide as great financial support for training and adaptation to the new environment as HFSP did. EMBO has the idea of PhD nationality, which HFSP does not (see repatriation scheme). The LTF felt that three years is not always enough due to the highly competitive research environment. In addition, by the time the fellowship reaches the end, the awardee has to apply for a job and that takes time. For this, often, the awardees are sometime obliged to look for some additional funding for when the HFSP fellowship ends. It would be her preference to have a longer fellowship – 4 years would be much better than 3. HFSP encourages the international-intercontinental collaboration so there were no further comments on this. HFSP gave the opportunity for awarded to apply for a CDA and return to the host country. There is, however, an issue when the awardee has done the PhD in a country that it is not his/her home country. In this case in particular, the awardee was of one nationality while her PhD was from another country. It was not however possible for her to return to her original home country because her PhD had not been earned in that country and was not recognised as PhD degree there. It might therefore be useful to give the option to go back to the country where the awardee did the PhD and not to the home country. Otherwise, it would not be possible for this LTF to complete a CDA.

LTF Case Awardee 2

The Awardee completed a PhD in Human Genetics and, at the end of his PhD he got interested in Yeast Genetics and the genetics of transcription. Realizing the importance for his career of spending some time in the US, he then contacted several labs and finally found in Harvard Medical School an interest in working together. He joined the lab at Harvard in 2005 and started his post-doc. At that point HFSP appeared as an optimal option for a European citizen to do interdisciplinary research in the US. HFSP was the only scheme where he was not competing with citizens from the US; the scheme HFSP stimulated international collaboration; and the HFSP was the only fellowship that required moving fields and doing a post-doc in a different topic is regarded as something very positive. In his view HFSP fellowships are suited for very particular profiles. The awardee could have applied for EMBO but the calendar was even more restricted and he could have only benefit from one year funding (the post-docs last for 2 years). Also, the awardee noted that EMBO encourages post-docs in Europe but not elsewhere. The awardee believes there is some inflexibility in the criteria for award and in terms of time frame: HFSP requires the researcher to work on an interdisciplinary field but not to be too advanced in that field (less than one year working on the area), and that is a target that sometimes is difficult to meet. In addition, writing a post-doc proposal while finishing the PhD and trying to get papers published is often unrealistic, especially if you haven't started your post-doc. There is also some criticism to the time of the award. The awardee notes that in Biology it is more common to have 4, 5 and even 6 years post-docs. A long post-doc is considered 8-9 years. In three years you can publish (he published a paper), but in order to get a faculty position one paper is not enough, that is why he is more in favour for a 5 to 6 years scheme. In terms of funding, the money that HFSP gave could be considered as "short", especially if you lived in places like Boston. However, Harvard "topped-up" the post-doc salaries so that they could reach their threshold (but this is more the difference in living between places). The extra allowance (for meetings etc) was valued as positive. For the future, CDA would be useful to him to return to Europe. The CDAs are very relevant for independent group leaders who have recently benefited from LTF. It was really appreciated that after the LTF there was really a follow-up with the CDA. Regarding deferral, going back to the home country for the last year of a fellowship might be risky because, at the end of the second year, the post-doc is often still doing experiments and writing papers.

CAREER DEVELOPMENT AWARDS

CDA Case Awardee 1

The awardee is from France. He had a LTF, a STF and a CDA. He left from France to the US in 2002 because the fellowships allowed him to be much more flexible in his research, as he wanted to change his field from molecular biology to neurobiology. The LTF guaranteed him the flexibility to do so even without a proven record in the area. His expectations were fulfilled, he felt no restrictions whatsoever. His adjustment to new areas and getting into the network was difficult, but paid off. He did not have any doubt that he wished to return to France one year after the LTF had finished, i.e. he had funding from other sources, mainly the host organisation, to finish off the work he had begun. While he felt he could return to his home country and the organisation from which he came easily enough, the CDA was a bonus in that it enabled him to continue his research with the critical mass needed – also compared to national funding schemes. However, it took some time to establish the understanding in his new CDA organisation that the CDA is to be used as his award rather as another grant for the host organisation. His STF was instrumental in finishing some work in the US after he had returned to France.

CDA Case Awardee 2

The awardee is from Spain. She was awarded a LTF directly after the PHD in 2002 in which she changed from Medical Genetics to Bioinformatics. The motivation to go for HFSP was to driven by the desire to change the field, but an EMBO application was pending while she received the HFSP. She took advantage of the possibility to do the third year of the LTF in Spain. While there was no problem with the LTF and the host organisation at all, she admits that the transition into a new area within life science was hard and led to a gap in publication. A two year fellowship would have been problematic mainly for that reason. The CDA followed immediately after the LTF finished which was felt to be ideal. The CDA helped in two very important ways. Firstly, it helped financially, in that she was able to start the research group. Secondly, it gave her autonomy, as she was regarded as being independent with this CDA and could develop comprehensive leadership. The only comparator scheme that might have been available to her was the ERC starting grant. However, while the ERC starting grant might be a first option, it is the case that the CDA and ERC starting grant are not comparable and that the ERC might be even harder to get than the HFSP award. The management of the CDA by the HFSP has been extremely flexible and positive.

YOUNG INVESTIGATOR GRANTS

YIG Case Awardee 1

This individual held a YIG which finished four years ago. He was one of the first to hold one and now is not currently looking to receive funding from the HFSP. He was very enthusiastic about the YIG, believing it to be an excellent scheme that is very highly regarded throughout the world. He felt that there were no real comparator programmes for the YIG either then (i.e. when he applied) or now that allow international interdisciplinary research to be carried out. In fact, nowadays, it is more difficult to obtain funding of this kind; hence the HFSP has a unique status. His own grant was not as successful as it might have been because of the need for specialist people to work in it. A computational expert familiar with biology proved difficult to recruit, but a longer programme to five years would not have made an improvement. As it was, they had a fourth year unfunded to see if they could finish their work. Generally though, more money and more time might be helpful for the YIG. The pressure on interdisciplinary research was higher – and there is a risk created by the funding mechanism that some people may invent projects that, while scientifically of great interest are genuinely very difficult to make successful. His project might have been one of these he thinks. The work he did might have been more successful if it had been done on smaller scale. Again, focusing on comparators, he noted that there are fewer schemes that are similar to the YIG and he notes that the funding of networks appears to be reducing in scope and scale throughout the EU and MSUS?. There is a tendency to move towards an NIH / NSF model where the grant is given to the institution and networks are not funded as often. This is not a good development, in his view. While there are some international forms of funding, they do not usually fund the research, only providing resources for meetings and not time. The early stage networks for the training of post docs do address the needs of researchers, these are good they operate in the US and in the EU. But HFSP should not operate such a system as such systems have by their nature to be very large. He made a comment about the STF, and stated that he thought the STF fills this gap to some degree, and is an excellent scheme, being a springboard to much important work. He believes that the CDA should be open to researchers who have not had LTF; it looks unfair. Finally, he noted that the HFSP is a very supportive organisation for those who are funded; “it’s a very interesting family to be in, but when you leave, you can’t get back in easily”. For example, the conference is fantastic – really good idea – but when you are not funded, you can’t go. You are not allowed. In his view they should allow 1/3 of the people to go who are previous holders. This might help HFSP to create networks that had slightly longer lifespan.

Workshops are often for only people who are funded. Some more openness into the HFSP might potentially increase the flow of ideas.

YIG Case Awardee 2

This current awardee is an enthusiastically strong supporter of HFSP, and has a YIG, his first HFSP grant and has set up his own lab in a US university. He will aim for further grants from HFSP. In his view, the YIG supports strong international and intercontinental research links and provided him with the real opportunity of carrying out interdisciplinary work. Gives greater scope than current US grants. For many young faculty, there is a real shortage of opportunities within the national grant (US) system for international collaboration; this is why HFSP is so important to the US. The scheme provides extra signal of international excellence – HFSP held in high regard within the research community; although in the US, the organisation and its awards are not that well known. There is, in his view, room for the scheme to be more strongly promoted to young faculty in the US. There is, in a sense, unmet demand at present. He believes that his organisation does not make better use of the HFSP awards. He does not believe that staff at his organisation have made applications in the past. To facilitate more international links for scholars like him, HFSP could potentially do more match-making and team building. He knows that there are researchers with whom he could collaborate out there; but in the US system it is hard to make the link. There is unmet demand, even in the US, for international collaboration. HFSP could potentially be more active here. He found the awardees conference in Berlin very useful. He met US academics that he would wish to work with but who were not known to him, even though they were in the same country. The conference makes researchers visible to each other who work in these cross disciplinary fields, which is a good thing. HFSP could make even more emphasis networking and creating links between the Young Researchers. This could be done by creating something like a membership organisation. He believes that more money and more time would be useful. But for him, the ability to take the research over a longer period – over five years – would be very valuable. So he would content with the same amount of money; but a longer period would be useful as the set up time for a grant in his institution (he thinks his institution is typical of US universities) is long; hence a longer grant period would be helpful. Flexibility allowed by the HFSP over the use of resources makes its awards some of the most desirable international scientific grants / awards to win.

YIG Case Awardee 3

This YIG received their award in 2003 and subsequently moved to France from Italy. They regard the HFSP as a key “brand of science funding”, one known to support the uncomplicated, flexible funding of daring projects. He regards the HFSP as superior to all comparators in all respects. His experience was that the YIG allowed him to work (with international and intercontinental partners) in a way that he could not easily have done through any other scheme. It was also a very flexible and easy scheme to be in. His collaboration with an Indian colleague also received some extra funding through an Indo-French scheme, but that scheme was very cumbersome and restrictive about what could be funded. When asked if he wished the HFSP to offer more help in building collaboration than they did for your YIG, he thought that there was already sufficient help given by the HFSP. In his experience, they always responded quickly and exhaustively to enquiries. He did wonder however if the HFSP’s exhaustive and detailed database of investigators might contain information about potential partners for a multidisciplinary project. This could be helpful where the issues to be tackled are so different from what you are used to that finding the right contact is not easy. When asked to consider whether the length of the grant was about right, he noted that generally the grant period was long enough. Furthermore, his grant had indeed been taken over four years.

However he also noted that truly frontier science may require 5-year full funding. He further noted that when an HFSP grant of this kind ends (YIG), the awardee is no longer allowed to attend HFSP events (unless they have another grant). Generally, it would be useful to attend HFSP events after your award (which could of course even be between awards), but he also noted that while he found these events interesting, and full of very good science, he felt there was some lack of structure at the events that would stimulate the establishment of future collaborations. This would be the plus of such an event over more conventional disciplinary events. It might help, he thought, for the HFSP to review the applicants and maybe try to group them and organize round tables so that they have the chance to interact in a non-random manner. If that kind of management of attendees were possible, these meetings would perhaps become even more attractive, and genuinely able to build upon the enormous human potential that HFSP manages to gather at these meetings.

Annex 2 - Comments from free text responses

From Host Supervisors

A fantastic program that significantly impacts on international research training and collaboration
As US federal funding has become more constrained, it is harder to recruit talented scientists from Europe, as many of our US-funded training grants require US citizenship or permanent resident status. Funding from the HFSP allowed me to accept an outstanding European scientist who brought important new technology and expertise to our project. I am much obliged and grateful.
Because the fellow was due to pay tax from her HFSP fellowship in her country, her net salary was lower than that of our own post docs. This had to be compensated for.
Excellent and accessible way to introduce physicists to collaboration with biologists –
Excellent scheme for innovative research and development of young researchers –
Extremely valuable programme recognized worldwide as being of the highest quality.
Fellowships for post-docs are the lifeline of my lab
Splendidly run programme with remarkably few administrative constraints.
Great fellow who I think got great training. He did not NEED much interaction, but there was lots of interaction as that's best for science and for training.
HFSP is a great program -- highest quality young scientists, minimal administrative burden not having health insurance covered is a problem : can't really put it on my grants
HFSP is a particularly important source of support for talented postdoctoral fellows seeking additional training in the United States. The largest source of post doctoral fellowships in the United States are individual awards from the National Academy of Sciences - Typically these are not available to postdoctoral applicants from other countries. Efforts have been made to change this but it is unlikely to happen in this political climate.
I am extremely grateful for the HFSP support. It has enabled us to push the boundaries in our field together. I have established a strong scientific partnership that I certainly expect to continue.
I am very grateful for your support which led to wonderful productivity and improvement in our science.
I have no doubt that HFSP fellowships fund the best international scientists who go on to run very successful labs. It is a fantastic program because it supports the most creative young scientists and gives them the independence to develop their own research program.
I think HFSP's role in encouraging young scientist's to get experience in other countries is essential for their intellectual development and greatly promotes international collaboration in science.
I think the administration of funds should process through the host organization. I think it is unusual and inappropriate for funds to be provided directly to the fellow. I think this put our institution in an awkward position with respect to local taxation rules, especially since benefits are determined from reported salary.
I thought the real strengths of the fellowship were: the length of funding is helpful (3 years versus the more common 2), the contacts that my fellows developed with other HFSP fellows, which are serving them well in their career.
I very much appreciated the scientific acumen, integrity, and interactive nature of my HFSP fellow. I think the program is terrific, and offers a route for many scientists to pursue research opportunities outside of their home countries that would not otherwise be possible.
It is a fantastic scheme. I have also seen it work well the other way around when two of my PhD students earned a fellowship to work abroad. One of them is now head of research for a major drug company and the other is a professor at a top Canadian university. The fellowships helped that to happen.
It is a good program. My first HFSP fellow was and remains a terrific scientist. The second one was not.
It is a great and unique program. Especially in the US it is difficult to get funding for international post-docs outside NIH R01s and therefore the HFSP scheme is tremendously important. I had the privilege to have a great fellow right after starting my lab. I think HFSP can have the most impact on new labs where finding comparable funding sources is difficult.
One limitation that often presents a problem is the rule excluding foreign scholars who have done their PhD training in the US. There are many Asian scientists who wish to continue their postdoctoral training in the US but who are ineligible for HFSP support. I can understand the reasons for this, but these foreign scholars have very few potential sources of independent fellowship support.

Terrific programme - which was implemental in extending the scope of research in my laboratory. I would feel very fortunate to have another with equal impact.
The 3 HFSP fellows I have had have been of very high quality
The HFSP and EMBO fellowship programs have played an integral part in the providing the financial abilities to support and train foreign postdoctoral fellows. Presently, six postdoctoral trainees from our small laboratory now hold professorial positions throughout Europe.
The HFSP fellow has only just left my lab and is now setting up his own lab. It is therefore too early to say whether future collaborations and connections will be formed as a result of the fellowship.
The HFSP fellow was truly outstanding and his accomplishments in my lab would not have been possible without HFSP support.
The HFSP fellowship program is one of the very top prestigious fellowships and I hope that the program will continue for a very long time! Thank you very much.
The HFSP fellowship scheme screens fellows appropriately and therefore the expectations are high for the fellow's performance. I was not disappointed!
The HFSP fellowships provide a wonderful opportunity for talented non-US national researchers to seek, and obtain valuable postdoctoral positions in the United States. The knowledge and experience gained from such positions enables researchers to grow professionally, and transfer their skills to their home countries upon completion of their fellowship .
The HFSP is a highly distinguished and important organization that promotes international research, contacts and relationships. It is an invaluable part of the research community.
The HFSP program for inter disciplinary fellows, was an attractive way to recruit a top notch foreign post doc, and allowed us to take a risk that someone from outside our area would be able to make a contribution. The experiment worked out very well, and our fellow now has an independent CNRS position in France.
The HFSP support was very effective and productive. All HFSP fellows from my lab became successful junior faculty - the most recent fellow is now heading her own research team at a Max-Planck Institute in Germany
The most recently finished HFSP fellow was probably the least successful in his time with me of the 3 that have completed to date in my lab - and he has gone on to a PI position back in his home country . My current HFSP fellow is quite simply one of the most outstanding post docs I have ever had and has already made major contributions to the future scientific direction of the lab.
There seemed to be no restriction on whether the postdoctoral fellow could teach while on the HFSP fellowship (I thought there should be such restrictions) so he got very involved in teaching during his last semester here, and his research productivity decreased during that term as a result.
These fellowships constitute outstanding opportunities, especially for the young researchers
This is a wonderful program that provides unique opportunities to the Fellow as well as to the host lab. This was my first HFSP fellow and I am very impressed with your organization and level of support.
This is a really excellent program. There is no other that provides such a general mechanism to allow me to recruit excellent post docs from abroad. Without this program, it would be much more difficult for me to be open to international post docs. I would very much like to see it continue or be expanded.
This was a wonderful opportunity and the fellow was outstanding. I believe this is a fantastic program.
It is an excellent investment for all parties concerned.
This is a truly excellent scheme. Both LTFs I've had in my lab produced ground-breaking work that was published in the highest quality journals (Cell Press) and made significant contributions to the field.
This is a wonderful program. Thank you for reviewing it.
This is an outstanding international program that encourages top young scientists to learn a new area and try interdisciplinary research.
This is a wonderful scheme and the prestige gained from having a fellow in my lab enhanced my track record and contributed to continued funding of my research. My fellow has since received a local fellowship and has settled in the country since she found the scientific and general experience deeply rewarding. I also maintained a close collaboration with the fellow's previous laboratory and we have had many co-authored publications.
This questionnaire seems to emphasize the benefit to the host laboratory. The main benefit of this excellent program is to the participating fellows. All 3 of the LTS fellows in my lab now have their own laboratories in Europe.

Some comments about the Grants

More personal contacts with excellent immunologists
it provided funds for research which are difficult to obtain in my country
I was promoted AFTER receiving the award, not BECAUSE of it: but it did increase my local reputation.
Improvement of research tools
Increase in funding, especially funding for a Postdoc that allowed me to venture into new disciplines
Respect from international colleagues and solicitations for new collaborations
I was awarded tenure; two of my postdocs moved on to faculty positions
When I was denied tenure at my original institution, the grant was an important indicator of the quality of my scientific work
Profile increased due to grant income
Being a HFSP grant coordinator is considered as a big achievement by the scientific community.
It allowed me to get a position in an American university
The grant opened my access to European scientific communities.
Scientific budget was well supported due to flexibility of the money allocation.
By coordinating the grant, it allowed me to help provide funding to two other groups that I wanted to collaborate with to do this project. We all get contacted for collaborations every now and again, but without the man power these typically go nowhere. The HFSP grant meant that I could effectively fund people in other people's lab to collaborate with me. Therefore resources no longer the inhibiting factor.
Improved chances of success in other grant applications
International recognition in field
Cemented the relationship with a leader in the field of genomics
I received an offer from outside and was elected in the German Academy of science.
Strengthened collaboration and communication with key senior researchers (at that time, I was the junior scientist)
Foundation for subsequent national grants
Provided crucial support for project development at early stage in career, provided bridge to subsequent major research funding.
Provided crucial support during relocation of the lab to different institution
Very well considered by Spanish funding agencies
Got tenure, got established as an independent research group
Increased autonomy
I obtained tenure 1 year after the end of the grant.
Added to my prestige
It helped in setting up an independent laboratory
Created a new collaborative project which could not have been funded otherwise.
Made a critical collaboration possible and broadened my horizons.
Help me gain confidence in taking risks outside of my discipline
It helped me to become even more competent in realizing and coordinating a planned research project
Flexibility to adjust my research, and independence from intramural support.
Offered independence
Creative research freedom
Increased my visibility in my host institution

Some comments about the STF

This was an excellent opportunity for me, at the time, to establish international collaboration. I appreciated receiving the award tremendously and learned quite a lot in the process.
One improvement, would be to give option of renewal or reapplication with preferable evaluation. as this would allow sustained interaction prior to long term funding. Funding is so tight, it often takes multiple applications for deserving project
The fellowship of the HFSP allowed me to sustain the efforts I had already started.
It offered a great opportunity for international collaboration that would not otherwise have been funded.
The restriction on collaborating in countries not visited before could be reviewed
The stipend could be linked more realistically to regional cost of living.
It was very useful and flexible indeed: other short-term fellowships (FEBS, EMBO...) only allow for visits within Europe
The only thing that would stop me applying for similar funding is the hassle, stress and expense of obtaining work visas.
This was a very beneficial award to receive, providing me with valuable experience and research contacts, as well as allowing me a concentrated amount of time to devote to a research project.
Would be nice to have the opportunity to apply for more than 3 months, e.g. 6 months or up to 1 year, for a postdoctoral Fellowship
The outcome of my STF was a published paper.

The HFSP fellowships are a very good programme indeed. Please keep them going.
I rate the short term fellowship very highly

The program provides effective access for third world scientists to state of the art techniques and knowledge.

The Human Frontier Science Program has been of extreme importance for establishing intercontinental collaboration and for my personal career development

This is a wonderful program, which provided me with a unique research experience. It was a very important experience, that allowed me to start new scientific interactions and collaborations

It was fantastic and very un bureaucratic to apply for and to report on. It was just a shame that there was no follow-on grant I could apply for.

This is the only short term fellowship I found that was as long as 12 weeks (necessary for me to establish the work). In my experience (and I have applied for and got other STFs from other sources since) they only fund a maximum of 6 weeks which is not

HFSP gave me an invaluable opportunity to pursue research I would have struggled to achieve otherwise. I have recommended the programme to many other postdoctoral researchers.

The STF is an EXCELLENT program! It was expertly administered and the flexibility and low level of bureaucracy makes this one of the best fellowships schemes I know. Please don't change anything!

The HFSP programme really did provide a unique opportunity to initiate and maintain collaborations in a top USA laboratory. It helped provide training in techniques and confidence for independent research. It was probably the most valuable and enjoyable

Some comments on HFSP and career

It gave me academic freedom inside the lab I was in.
In every way - it allowed me to do the research I wanted and am still doing, to meet my colleagues, to have (crucial) independence and more.
I understood what kind of science I really want to be involved in
It had an impact on my ability to sustain myself in the US and therefore increase significantly my international experience
Enabled independence and thus building first steps of a future topic to start a lab with
Gaining knowledge and perspective of life scientists in disciplines I would never otherwise interact with; enabling me to dream of doing entirely new experiments I never would have thought of
Opportunity to redirect my research interests, prestige of the award.
Reputation. Experiencing different cultures.
The annual meeting was very good. The fellowship money help my transition to life science research and my attraction to my host
Introduced new research areas, gave me freedom to explore more aggressive research agendas.
Enabled me to get training in an area that would not otherwise have been possible
Learning from different disciplines, methods and integrating this knowledge for future planning. I plan to continue doing cross-disciplinary research and run my own lab.
It gave me the possibility to concentrate in my research without worrying about the funding. It allowed me to go to conferences which increased my interactions with other scientists. It increases my reputation. It opens the option for the CDA.
It allowed me more freedom and flexibility to pursue and expand my research, and establish interdisciplinary collaborations on international scale.
I had time to re-integrate in an interdisciplinary field with good financial support and I was able to obtain a position in a reasonable time afterwards.
it allowed me to explore a new area of research at the interface of two disciplines (structural cell biology & neuroscience)
Provided confidence and flexibility
It allowed me to pursue exactly the project I wanted to do and enabled me to establish very valuable collaborations
Broadened my scientific skills and understanding of the science world (from a career point of view)
Bridging theoretical and experimental science
Independence, prestige.
It demonstrated my ability to attract funding in my own right. It is viewed as a very prestigious award. It helped me to make some international contacts
Gave me visibility and recognition

Financial autonomy, building a research network and broaden my background
Being an HFSP fellow helps in getting jobs
Gave me a long enough period of postdoctoral research
Increased visibility and reputation
Because it is a prestigious award, it will help my career
The fellowship allow me attend some important meetings in the field. it improve my access to key communities. Broadened my scientific horizon when visiting collaborator with the support of the fellowship.
Prestige, interaction with peers at the HFSP meetings
Looked good on my CV, increased my reputation, helped with future grant applications
More freedom to pursue interests
It gave me recognition for obtaining the award, it gave me more confidence in the laboratory and in the scientific community
Gave me freedom to do focus on my project (which is not the major project of the host lab), to go to interdisciplinary conferences, added prestige,
Provided support at a key stage of my career
I was able to stay as a post-doc in the host institution in which I was already working, during which I was able to publish 2 articles
Enhanced research skills, networking, broadened horizons, demonstrated ability to generate funding
It allowed me to compete for job positions later on
People accept better that you are trying to think/work across disciplines and within Life Sciences
Provides an opportunity to join a research program outside my home country
Gave me relative freedom (because of salary), increased my reputation because of HFSP reputation
The prestige of the HFSP award played a critical role in getting a permanent researcher position
I had more freedom to decide my research I could buy important pieces of equipment for my research
it increased my scientific reputation
It allowed me to change research field and have more independence in my host laboratory
It increased my confidence and my visibility. It provides for freedom in going to conferences. It provided a substantial economic help to support my family
It allowed me to get a position at the end of my HFSP long term fellowship
It enabled more travel to conferences.
Gave me enough time to work on a different project and to finish it
The fellowship gave me a definite independence in my host institution and I could carry out researches on my interests.
It warranted my independence in during my stay in the host laboratory.
Give me all the freedom to perform a productive post-doctoral stay
The prestige, the good payment, the funded third year (very important: two years are too short, especially if you risk something).
Well known and respected award, sign of high quality research
Recognition and flexibility in cutting edge research
I could decide in which lab to go and work
It has laid the foundation for an independent career in science.
Changed fields, build network of international connection, Improved my publication record
Bench fee increased independence in selecting side projects, conferences to attend etc
It help me undertake a fantastic postdoctorate, which in turn helped me get a PI job at a renowned University
Published some high impact papers on the project. Helped to find a permanent position after a second postdoc.
It made it possible for me to take up the postdoctoral position I wanted, and in the end it allowed me stay at the host institution longer than if I hadn't received it. The prestige associated with an HFSP fellowship has also greatly strengthened the perception of my CV.
Simply put, it allowed me to jump into a Life Sciences field that was completely new to me and combine it with my previous background to approach it in an innovative way.
The fellowship allowed me to get a post-doc position in a top tier lab, and improved my chances of getting a second post doc fellowship. It also probably improved my chances of a tenure track position, which I got in a R1 US university.
Opened doors because of the reputation of the award
It opened a new research path for me.
It was the first award I got when I started my post-doc, so it helped me in a huge way to concentrate on my research without stressing about stipend. Awarding it also gave me a lot of prestige and recognition. It basically spear-headed my career.
The award provided an intermediate position during which I was responsible and had control over many aspects of my work, but I was still able to work within the framework and benefit from the resources and expertise of an established lab.

Some general comments from LTF/CDF awardees

It was a great experience and I would apply for further awards in the future.
I think that the HFSP program is unique and wonderful. It fosters independence, innovation, open communication and scientific enthusiasm like no other program that I know.
I can't thank HFSP enough for the opportunity they gave me to grow as a scientist
It is an excellent program with very sophisticated administration. I appreciate it very much.
Improved my career.
It has been very helpful for me and my colleagues. Continued encouragement of cross-disciplinary international research is both important and appreciated!
It has been fantastic - really set me up for a career in science. Would have found it difficult to get into this area without the award
It is very flexible and extremely well organized.
I'm proud and happy to have been awarded a HFSP LT fellowship
I feel really thankful to HFSP. The program is exactly what I needed to make the change I wanted to do anyway. The fellowship made it possible.
I appreciate the incentive it gives me to pick up more cross-disciplinary skills.
As far as I know, this is the best funding program available that enables to switch between research fields and create strong interdisciplinary (and sometimes risky) research. When moving into biological research from physical sciences (especially if from theoretical work) the transition is longer than two years and can take easily four years, so the option to go back to the home institute after two years becomes irrelevant
Excellent programme that offered me an incredible freedom for a 3-year-long research experience, a clear visibility in term of excellence and full independency for developing the project in the host institution as well as for using the RTA
Taken together the HFSP Long Term fellowship is probably the best fellowship compared to other similar fellowships. But It can't fix the general structural difficulties that young scientists face early in their career.
I sincerely thank the HFSP. It provided a fantastic period for me and my future carrier.
It is great. Especially the flexibility of the team and the lack of bureaucracy are amazing (notably compared to EU).
The postdoc fellowship is very good. I found the administration unbureaucratic and repsonsive and the allowance and duration highly attractive
It greatly stimulated my development as a scientist and expanded my knowledge considerably. I am very grateful to have received a HFSP fellowship and am sure HFSP is very important for young scientists all around the world.
please help career development of post-docs - many just get used as lab managers/supervisors and cannot focus on their own research
Very "user friendly" and paperwork free, when compared to similar programs. Very friendly communications and easy problem-solving when needed. Thank you!
CDA award should include "Europe" as one country for European long-term fellows wanting to return in Europe
It has been an excellent source of funding for my postdoctoral work. I am extremely happy to have been a part of it. It has allowed me to be independent much earlier than I would have been otherwise.
Wonderful opportunity for young researchers
The funding program of HFSP was great and I really appreciate it. Thank you very much!
Generally speaking, the HFSP funding program is just excellent. But if you could support more those who wish to establish lab outside of home country, it would be also very nice. The possibilities for applying CDA is bit restricted, so I think.
Outstanding, esp. HFSP personnel.
Excellent Program, please continue it, but with less emphasis on intercontinental cross-disciplinary research, collaborations come naturally and cannot be forced by funding scheme
I am very thankful that part of my post-doctoral research was supported by HFSP and it played a major role in obtaining my faculty position.
Even three years funding is becoming too short for a posdoc. Combining my two fellowships over 4 years was ideal for me.
I think that the family allowance is not adequate. Moving a family into a different country is a major obstacle in integration in the new place and until the family is settled, science is compromised. The HFSP LTF is a fantastic funding for a single postdoc, but to fund a family with only additional 10% allowance is extremely difficult and stressful. In addition some relocation allowance could be very helpful.
Perhaps even too much focus on interdisciplinary aspect. It should be possible to apply for CDA even if you do not return to your home country - sometimes this is not possible for scientific reasons and that should not be punished.
i like your interest in interdisciplinary science. However, when I attended the HFSP annual meeting in 2004, there was hardly much interdisciplinary work being presented. I did not attend any HFSP meets after that. I hope that the situation is better now
It gave me the confidence that I can conduct independent research
HFSP is a great funding group and should foster fellow community.
I greatly appreciated the support by HFSP so far, and it has made a significant improvement to my research and financial situation, than if I had to go without a HFSP fellowship.

<p>I think HFSP is the best funding program for postdocs available because it provides funding for three years, offers the opportunity to meet many colleagues through the HFSP meetings and collaborations and - perhaps most importantly - has follow-up program like the CD award.</p>
<p>The research allowance allowed me to travel back to Canada to follow the latest research and remain visible for future job perspectives. The CDA is an excellent opportunity for young investigators.</p>
<p>It's fantastic, in particular, it's extremely well managed.</p>
<p>Support towards young investigators is enormous and I don't think any other organization excels HFSP</p>
<p>It should be made clear that the decision on spending the research allowance belongs to the scholar not to PI.</p>
<p>Overall, I am grateful to HFSP for providing me with a fellowship and have been very happy with the fellowship. There were only two small things that could be changed. 1) It would be nice if you relaxed the application criteria - You should not have completed one year in the fellowship lab at the start of the fellowship. This means that if you join the lab between September and March, you have to apply for the fellowship before joining the lab. 2) The second comment concerns the rule that your salary can be supplemented if you're below the minimum salary of the Institute. Often, the fellowship is above the minimum salary for a 1st year postdoc. But, at the end of each year, a postdoc normally gets a small increase in salary. This does not happen with the fellowship because of the fellowship clause.</p>
<p>Overall, HFSP funding program is excellent; the one major flaw for me particularly is that CDA is only for scientist going to their home country, the EU-based scheme might provide more flexibility.</p>
<p>The living allowance is perfect for singles, but it gets difficult for young families (wife cannot work + baby)</p>
<p>Please consider inequalities in funding between different host countries, because of taxation/non-taxation of fellowships and living costs. Fellows in the USA are substantially less well funded than fellows in Europe.</p> <p>Use the HFSP journal to create a tighter community by inviting HFSP postdocs and young investigators to write brief educational reviews on their work or areas of interest: this section of the journal should be for a general audience to help breakdown barriers between fields; allow more speakers at meetings by having short 5-10 min talks; need a lot more career development guidance for lab management etc. - currently HFSP offers none</p> <p>My experience is that the biggest impact is the independence you get and the fact that you succeeded in getting a very competitive grant. Furthermore, compared to other grants the funding is very flexible and the organization is clearly promoting the scientist and keeps bureaucracy on a very low level. All this makes it a great fellowship to have and I have benefited a lot and very thankful for the support</p>

Annex 3 - Executive Summary of the Commercialisation Report

1. This Executive Summary reports on the work of a Study Team from the University of Manchester which was asked to examine the commercialisation activities of scientists funded by the HFSP. The report of the Study Team reviewed individuals who had previously been identified in two earlier pieces of work, an HFSP poll of researchers – former awardees – which was carried out in 2008 and by a more in depth study by Mitsubishi that took place in 2008. These two pieces of work identified commercialisation activities arising from HFSP awards, although the Mitsubishi study was extensive and detailed and examined scientific impacts of the research also.
2. The aim of this research study has been to detect the role and influence of the HFSP upon commercialisation activities arising from, in whatever way, its funding activities. The approach used a pre-determined sample of promising examples, i.e. where there was a prior expectation, based on the knowledge of the scientists in question, that HFSP had had an influence on their commercialisation actions, activities and achievements.
3. The review was able to draw on the detailed investigation of six cases of commercialisation related to the HFSP awards, and generally to review another 12 examples. It was the target of the Study Team to examine up 7 or 8 cases in detail as case studies but, despite extensive and thorough attempts to make contact with 12 further cases, it was not possible to secure the cooperation of any of these other 12. We believe that our study is therefore accurate so far as these six cases are concerned, but limited in that only half the detailed cases we hoped would engage with the study were willing to do so.
4. The review shows that certain HFSP scientists are heavily involved in work with commercial impacts. Many of these commercial impacts can be clearly be related to HFSP grants. Furthermore, in the cases interviewed, HFSP awards made possible commercialisation activities that would not have been easily possible otherwise, for example through other funding schemes. This is because HFSP awards are virtually unique amongst funding schemes in providing the opportunity for leading scientists to make radical changes to academic disciplines.
5. Ground breaking international and intercontinental research of the kind which is funded is central to the development of these commercial impacts. There are many useful and important funding schemes in all countries world-wide that demand application potential and “milestones” for research achievements. However, schemes like the HFSP can clearly lead to breakthroughs that would not have been possible in those application oriented programmes as, by definition, they were not to be planned or foreseen.
6. In the case studies chosen, there are commercialisation processes in which scientific knowledge that resulted from HFSP awards are accelerated or assisted by other actors or institutions. These other actors or institutions comprise the following: university technology transfer organisations, companies seeking to learn about new scientific knowledge and techniques, venture capitalists, other research grants where the conditions for funding allow or expect a commercial output, outcome or impact. The influence of other individual co-workers and collaborators should also be considered.

7. The commercialisations identified here are not attributable solely to HFSP, therefore. All the researchers interviewed in the cases were academic scientists first and foremost during their research. Their aim during their research was to generate scientific knowledge including methods for generating new scientific knowledge. Thus, commercialisation has not been planned and expected in that it was not part of the initial proposal; but in the limited number of cases we have examined, it has occurred, potentially with significant socio-economic impacts.
8. The impact of funding on the careers of awardees should not be overlooked. Five of the scientists interviewed have become academic entrepreneurs in that they now own companies that exploit scientific knowledge.
9. In four of the cases interviewed, the academic partner (the former HFSP awardee) was able to give significant information about the commercial potential of the innovation. This was because the awardees had become heavily involved in commercial activities themselves, being the head of companies involved in the commercialisation of their HFSP related research or of a related commercialisation.
10. Commercialisations identified here are in the form of tools or instrumentalities. This is not surprising as IP protection takes this form. But the central paradigm for commercialisation here appears to be that of tool development and in particular within the context of drug design and drug discovery. All the cases interviewed therefore have developed during the course of their research methods and approaches which, while essential to the pursuit of further scientific enquiry, are also central in the design of materials / substances with a commercial application, including drugs.
11. Markets or such products are of significant economic and social importance. Single agreements for particular drug discovery can reach tens if not hundreds of millions of dollars.
12. More information about the economic value of agreements made by HFSP awardees in these areas would be required to make a more reliable comparison between the HFSP contribution to this area of economic development and that taking place a) as a result of other award schemes, and b) from intramural pharmaceutical company research.
13. All but two of the set of 12 other researchers (not including the six cases above) had produced patents at some point in their career. One had earned a patent before his award from HFSP. Of all the others, where patents had been registered, the award of the patents had followed their HFSP award. The gap between award date and patenting activities varies. The following gaps were noted: 0 years, 1 instance; 1 year, 2 instances; 2 years, 1 instance; 3 years, 1 instance; 4 years, 2 instances; 5 years, 1 instance; 12 years, 1 instance.
14. Our review of material related to commercialisation of HFSP research is confined to the cases we were provided with at the start of the Study. However, we believe, based on work carried out in our related review of the HFSP about the research fields it typically funds – in what might be Pasteur's Quadrant – more widespread commercialisation of HFSP science is very likely to be more widespread. Furthermore, HFSP awards may facilitate much relevant commercialisation in the longer term. HFSP awards clearly do not restrict commercialisation.
15. The socio-economic (commercial) impact of papers funded by HFSP could be further explored by examining patent applications and or granted patents in various fields, for

example the field of drug discovery, and reviewing how many HFSP papers are cited in them.