

More Than the Sum of Its Parts: Transregional Collaborative Research Centres

Key findings from an evaluation of a variation of the Collaborative Research Centre programme

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Since the option was introduced in 1999 to apply for Collaborative Research Centres involving two or three universities at multiple locations, more and more universities have taken advantage of it. Transregional Collaborative Research Centres have found their place in the DFG funding portfolio. Ten years later, a look back: Did the expansion of the Collaborative Research Centre programme live up to its promise? This Infobrief presents some of the results of the evaluation.

1 Background, Data Base and Methodology of the Study

Since 1999, the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) has been funding Transregional Collaborative Research Centres based at multiple universities. The goals and requirements of the Collaborative Research Centre programme are the same for traditional Collaborative Research Centres (Sonderforschungsbereich, SFB) and Transregional Collaborative Research Centres (SFB/Transregio). By funding long-term research endeavours for up to twelve years, the programme aims to foster excellent research within networks and prioritisation within universities. A goal specific to the SFB/Transregio programme variation is that it wants to support researchers based at two or three different universities to work on complementary topics, network across regions, and share material and human resources. All participating universities must meet the same scientific and structural requirements that are needed to establish or renew a tradi-

tional SFB. In addition, the contributions made by each partner must be essential, complementary and synergistic with regard to the research objective. A SFB/Transregio is expected to connect the best teams available in Germany. This should particularly enable small universities and departments to take advantage of the Collaborative Research Centre programme.

The SFB/Transregio programme variation was initially set up for a limited time. After a ten year pilot phase, it is now being evaluated. In their study "Evaluation der Programmvariante SFB/Transregio" (Evaluation of the SFB/Transregio Programme Variation), authors Anton Geyer, Erik Arnold, Barbara Good and Leonhard Jörg, from Technopolis GmbH in Vienna, look back at the history of the programme so far and investigate to what extent the objectives of the SFB/Transregio programme have been met. Many aspects are analysed in comparison to traditional SFBs. To do so, they defined a comparison group consisting of 41 randomly chosen SFBs which were established since 2000 and whose research area and funding status corresponded to the SFB/Transregios.

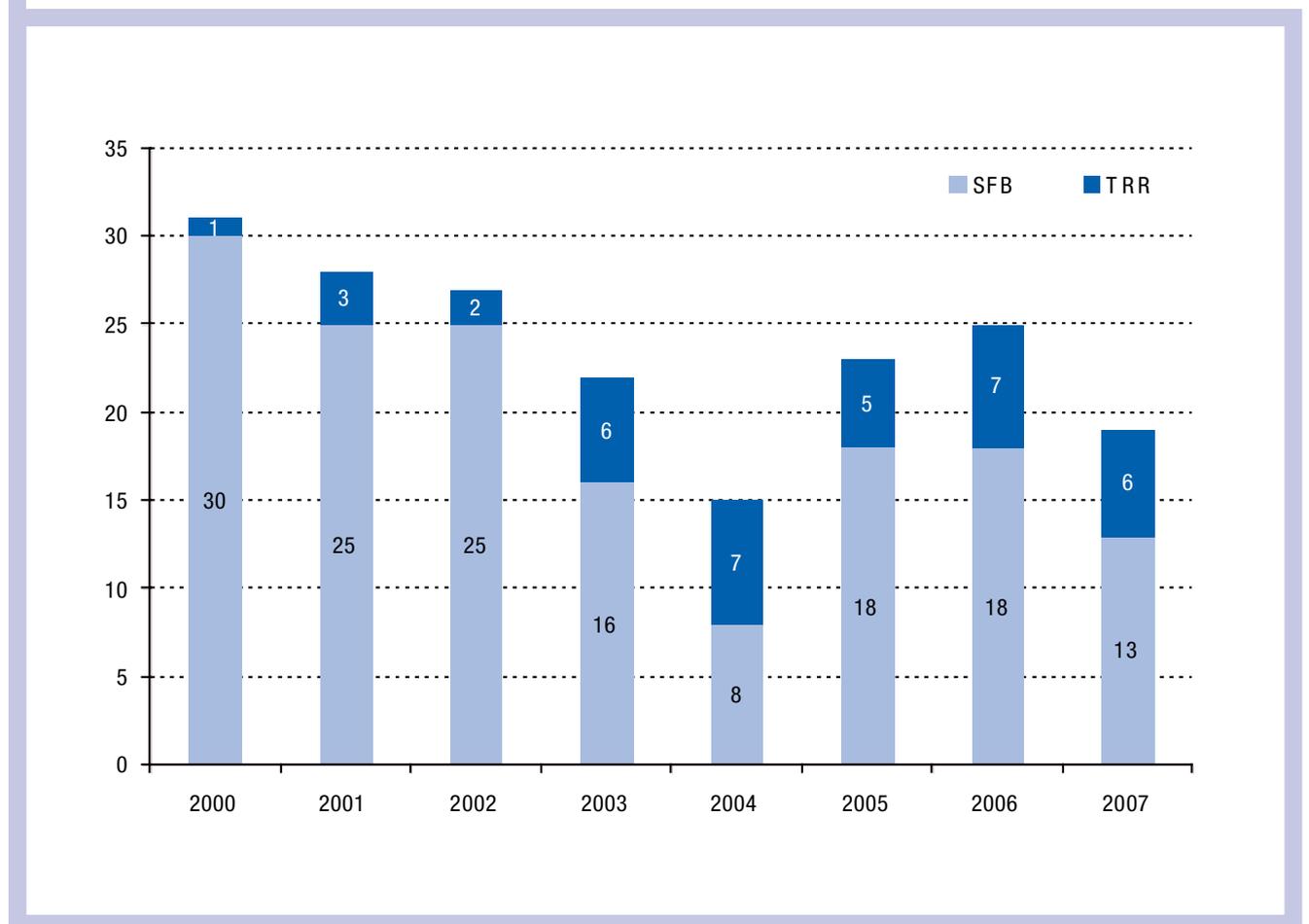
For their evaluation, the authors used various data sources and methods. They analysed concepts and proposals for SFB/Transregios, minutes and meeting reports, as well as data provided by the DFG on the participating universities and project leaders. In 38 interviews, speakers, project leaders, managing directors, reviewers, committee members and university heads shared their assessments of this funding instrument and their practical experiences with SFB/Transregio projects. Bibliometric analyses provided additional understanding.

The study covers the years from the launch of the funding programme in 1999 through the end of the year 2007. During this period, 81 SFB/Transregio concepts were given preliminary consultations, and 45 establishment and 13 renewal proposals were officially reviewed. Of these, 37 establishment and 11 renewal proposals for SFB/Transregios were approved. Figure 1 shows the history of the programme. The programme variation took some time to gain foothold, but in recent years about one-third of established Collaborative Research Centres were of the transregional variety. Due to ongoing long-term SFB projects, SFB/Transregios so far account for 15 percent of all active Collaborative Research Centres. Their share is substantial in the natural sciences

(25 percent), notably physics; but small in the humanities and social sciences (5 percent), with only one SFB/Transregio in economics. In absolute numbers, the most SFB/Transregios during the reporting period were established in the life sciences (16 in total), which corresponds with the large number of Collaborative Research Centres in medicine and biology overall.

Annual funding for a SFB/Transregio averages 1.82 million euros (incl. 20 percent overhead funding since 1 January 2007). This is about the same amount as for a traditional SFB. Altogether, the DFG funded SFB/Transregios with 339 million euros from 2000 to 2007.

■ Figure 1: Number of traditional (SFB) and Transregional Collaborative Research Centres (SFB/Transregio) established from 2000 to 2007



Source: DFG Head Office. Analysis and chart: Technopolis

2 Selected Results

2.1 Scientific Excellence

The basis of any DFG funding is the high scientific quality and originality of the research project. For SFB/Transregios the requirement of scientific excellence is at least as high as for traditional SFBs, because a SFB/Transregio allows the best research teams to join forces across locations. To examine whether funding does indeed go to superior research

Medicine, however, is a very suitable discipline for this purpose: it is a publication-intensive field where most papers are written in English and catalogued in relevant publication databases. Moreover, medicine is the area in the Collaborative Research Centre programme that receives the most grants. This research area was therefore selected to compare publication and citation of the work of 473 project leaders from the eight established SFB/Transregios and nine comparison-group SFBs by using the Hirsch Index².

Table 1: Distribution of the h indices of project leaders in SFB/Transregios and comparable SFBs (research area: medicine)

Minimum h index (percentile)	90 %	75 %	50 %	25 %	10 %	<i>Base: Eight TRRs and nine traditional SFBs established from 2000 through 2007 in the DFG research area of medicine</i>
TRR (n = 236)	7	10	14	22	31	
SFB (n = 237)	6	10	14	21	29	

Source: Elsevier Scopus. Analysis: Technopolis

chers and projects, Geyer et al. analyse from various angles the assessments that DFG reviewers have made when evaluating proposals.

Review panels grade each project on a scale from 0 (not worthy of funding) to 5 (excellent). Compared to the projects of the comparison-group SFBs¹, the evaluations of SFB/Transregio projects do not vary substantially. The only minor difference is that more SFB/Transregios than traditional SFBs (four vs. one) achieved grade averages above 4.0 (i.e. very good to excellent). Against the backdrop of very high standards overall, SFB/Transregios do not seem to fulfil the expectation of even higher scientific quality.

As a further indicator of scientific excellence, the authors investigate the publication record of SFB project leaders in the area of medicine. Discipline-specific differences in publication and citation practice prohibit the use of bibliometric methods to assess research productivity and reception in many research areas, and especially across subject areas.

Table 1 shows that the mean h index for both groups is 14, i.e. 50 percent of project leaders published at least 14 papers that were cited at least 14 times each. A small, statistically insignificant difference can be seen in the respective top tiers. The top 10 percent of SFB/Transregio project leaders achieve an h index of at least 31; for SFBs this value is 29.

A look at the distribution of the h index of each individual SFB/Transregio and SFB shows that SFB/Transregios feature more outliers and extremely high values. This indicates that individual "publication champions" are more frequent among SFB/Transregio project leaders.

These findings suggest that the scientific quality of SFB/Transregios is at least as high as in traditional SFBs. Statements given in interviews point in the same direction: a SFB/Transregio is seen as a funding instrument for researchers that are not only very successful but also experienced.

1. Includes only establishment and renewal proposals that were approved.

2. For publications since 1996, excluding self-citations. For the methodology and background of the Hirsch Index, see e.g.: Bornmann, Lutz & Daniel, Hans-Dieter (2005). Does the Hirsch Index for Ranking of Scientists Really Work? *Scientometrics*, 65(3), 391-392.

2.2 Extent and Intensity of Cooperation

The special expectation for SFB/Transregio researchers is that they collaborate in a focused manner even across locations.

In the interviews documented in the report, many speakers and project leaders say that cooperation is more comprehensive and intensive in SFB/Transregios than in localised SFBs. They base this assessment on the transregional colloquiums, seminars and conferences that many SFB/Transregios hold on regular basis. They believe that cooperation and scientific exchange generally happens in a more planned and formalised manner compared to traditional SFBs. Working programmes that are often tightly interwoven ensure vigorous exchange between project members across locations.

The participants believe that this benefits especially younger researchers. Cooperation across locations gives them a forum to present and distinguish themselves beyond their own university. Doctoral-researcher exchanges and colloquiums offer perspectives beyond one's own working group and open up possibilities such as approaching a specific research programme with a broader range of methods.

Partnerships are also entered with non-university and international research institutions. About two-thirds of all SFB/Transregios include projects based at non-university institutions. This is about the same portion as in local SFBs. About 14 percent of DFG funding goes to projects at non-university research institutions. The most frequent partners are the institutes of the Max Planck Society. More than one-fifth (eight out of 37) of SFB/Transregios include partner institutions (universities or research institutes) outside of Germany.

To obtain specific clues regarding the form and extent of cooperation, Geyer et al. have analysed the copublication data in the publication lists of the 15 renewal proposals that were submitted until

autumn 2007. Renewal proposals must list all publications that originated in the projects of the previous funding period. At first sight, the findings seem to contradict the participating researchers' claim that SFB/Transregio members cooperate frequently and intensively: only one in ten publications has authors from two or more SFB/Transregio locations. Almost half the publications (48 percent) come from partnerships with other domestic or international institutions. About one-third of publications (35 percent) are by authors from one single SFB/Transregio location³.

At second sight, however, there is no contradiction between intensive cooperation with others and within a SFB/Transregio. Scientists cultivate long-term partnerships and pursue broad research agendas in which the support provided by a SFB/Transregio is only one element. Beyond that, publications with other, particularly international partners may be considered especially prestigious and therefore listed in proposals.

2.3 Prioritisation and Structural Impact

A key objective of SFB/Transregio funding is to encourage prioritisation of research programmes at universities. A SFB/Transregio has a special obligation of demonstrating its structural impact at all of its locations.

To ensure prioritisation, the DFG limits the number of applicant universities and locations per SFB/Transregio. During the early phase, rules regarding the number of applicant universities and the inclusion of individual projects based at non-applicant universities were not always enforced. But in 2004 the Senate Committee on Collaborative Research Centres discussed the development of this programme variation and decided to insist on a strict maximum of three locations per SFB/Transregio. SFB/Transregios that appeared structurally

3. Six percent of publications cannot be attributed to a specific SFB/Transregio institution.

questionable were to be advised and reviewed even more intensively, even during the run-up to the proposal.

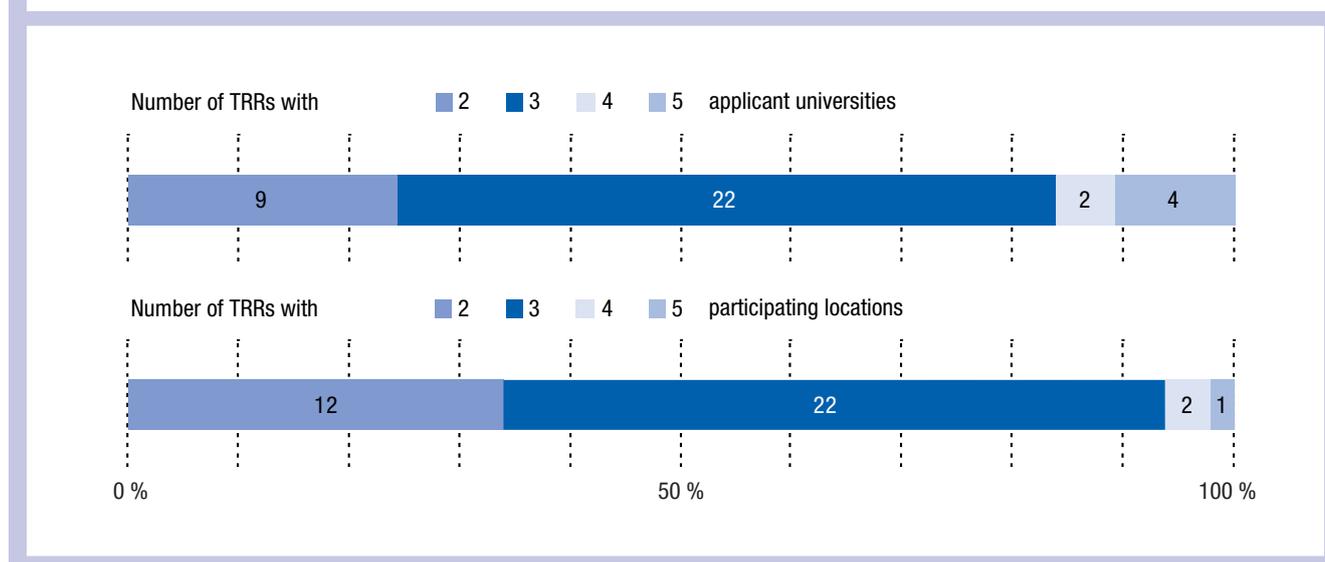
The study indicates that the structural standards are mostly met. Figure 2 shows the number of SFB/Transregios by number of applicant universities and by number of participating locations (e.g. Munich with several universities at the same location). About two-thirds of SFB/Transregios involve three locations and/or universities. More than four out of five SFB/Transregios meet the structural criterion regarding the number of applicant universities. Over 90 percent are based at two or three locations. The three SFB/Transregios with more than three locations were all established before 2004, i.e. before the limit was strictly enforced.

the number of full-time faculty. According to these categories, of the 85 universities that were granted at least 500,000 euros in DFG funding between 2002 and 2004, 16 are large, 54 medium-sized and 15 small.

Altogether 63 different universities participated in 190 Collaborative Research Centres (incl. SFB/Transregios) established from 2000 to 2007. Of these universities, 37 applied for at least one SFB plus at least one SFB/Transregio; 16 universities participated only in one or more SFBs, and 11 only in one or more SFB/Transregios.

As Table 2 demonstrates, large universities are usually able to establish both SFBs and SFB/Transregios; none of the large universities has only a SFB/Transregio. For midsize universities, the

Figure 2: Number of Transregional Collaborative Research Centres (SFB/Transregios) established from 2000 to 2007, by number of applicant universities and by number of participating locations



Source: DFG Head Office. Analysis and chart: Technopolis

When the SFB/Transregio programme was established, it was expected to improve the chances of participating in the Collaborative Research Centre programme particularly for smaller universities and smaller subjects lacking the "critical mass" for an SFB. To examine whether this objective was reached, Geyer et al. classified the universities by size into large, medium-sized and small institutions, based on

ratio is balanced. But contrary to what one might expect, small universities are not represented very strongly in the SFB/Transregio programme; they actually have more SFBs than SFB/Transregios, in both absolute and relative numbers.

The study also probes the assumption that small subject areas at universities participate more in SFB/Transregios than in traditional SFBs. Geyer et al. con-

clude that a somewhat larger portion of small-to-medium departments participate in SFB/Transregios versus comparable SFBs. However, almost three-quarters of SFB/Transregios involve at least one subject area at a university that is among the largest

sity) dominates too much. While it is quite customary for one SFB/Transregio partner to be larger or provide a stronger research environment than the others (see above), many SFB/Transregios cooperate on a basis of equal partnership. But Geyer et al. also

Table 2: Universities with SFBs and/or SFB/Transregios established from 2000 to 2007, by DFG size category

University size	TRR only location	SFB only location	SFB and TRR location	All SFB and TRR locations	All universities with DFG funding*
Large	0	3	13	16	16
Medium	10	9	24	43	54
Small	1	3	0	4	15
Total	11	15	37	63	85

* Only universities with over 500,000 euros in total DFG funding from 2002 to 2004, and 20 or more full-time professors in 2003.

Source: DFG Head Office. Analysis: Technopolis

in Germany for that discipline in terms of number of professors. Even under this aspect, one might say that SFB/Transregios form around an outstanding (here: by size) department at a university.

Independent from the size of the participating universities and subject areas, each university applying for (part of) a SFB/Transregio is expected to demonstrate how prioritisation will be fostered by the SFB/Transregio and supported by the university. This criterion is given special attention during the review process.

The interviewees were therefore asked whether SFB/Transregios do in fact change the structure of universities. Overall, the SFB/Transregio participants (speakers and project leaders) as well as the university administrators find that SFB/Transregios are about as successful in providing structure-enhancing impulses as traditional SFBs. Interviewees pointed out that the universities' allocation of resources (e.g. incentives or bonuses for proposal submission as performance-based pay), appointment policies, and external presentation are all modelled on the approach of traditional SFBs. A university's identification with a SFB/Transregio tends to be strongest if it acts as its speaker. However, Geyer et al. note that universities may identify poorly with a SFB/Transregio if one partner (usually the speaker univer-

sity) dominates too much. While it is quite customary for one SFB/Transregio partner to be larger or provide a stronger research environment than the others (see above), many SFB/Transregios cooperate on a basis of equal partnership. But Geyer et al. also point out that there are certain applicant universities whose participation (as measured by the number of projects) must be rated as subcritical. The study concludes that it is doubtful whether these universities will experience a long-term structural effect.

3 Summary and Outlook

The evaluation of the SFB/Transregio programme is an important contribution toward illuminating SFB/Transregio funding practices and empirically capturing and positioning SFB/Transregios within the Collaborative Research Centre programme at large. The study's main concern is to determine whether the programme accomplishes its goals and how SFB/Transregios compare to traditional SFBs: Does funding indeed go to the best projects? Can prioritisation be achieved? Does networking and collaborating across locations produce a coherent and synergistic research programme? Based on their analyses, Geyer et al. come to the positive conclusion that the SFB/Transregio programme creates added value to the traditional SFB programme, and that collaboration across locations enables scientifically focused, cooperation-intensive and highly quality-oriented Collaborative Research Centres whose full potential would often not be realised at a single location.

In addition to these actual evaluation issues, the study looks at other topical areas that are important to the DFG in all its programmes. These include e.g. promoting young researchers, gender equality and interdisciplinarity. To briefly touch on some of the findings: Project leaders in SFB/Transregios are expected to be somewhat more experienced than those in traditional SFBs. One-third of them have previously led a project within an SFB, and 60 percent a project for which they received an individual grant from the DFG. Their average age is somewhat higher than in comparable SFBs. Thus the SFB/Transregio is a funding instrument used especially by established researchers. Because investigating a topic from various angles offers long-term possibilities to scientists and academics, it also provides young researchers with good working opportunities and a chance to raise their profile beyond their own university department.

When it comes to gender equality in academia, the programme does not appear to have a specific effect. But this is certainly true for other coordinated programmes as well. It remains to be seen whether the option to request special funding for gender equality measures, which has been available since 2008, will be used by SFB/Transregios to the same extent as by SFBs and show a long-term effect.

SFB/Transregios tend to be less interdisciplinary than traditional SFBs. Most interviewees believe that this narrower subject-area focus makes good sense. However, the evaluation was unable to clearly establish how interdisciplinarity can be captured and what positive and negative effects interdisciplinary collaboration may have. It would also be desirable to define and operationalise the term structural impact. On the one hand this would be helpful for the evaluation of the single proposal and on the other hand enable research evaluation studies to assess the impact more effectively.

The empirical inventory taken and the conclusions made by this study are an important milestone in evaluating the Transregional Collaborative Research Centre programme. The evaluation results

provide DFG committees with a very solid basis for the further development of the programme. The resulting recommendations will conclude the pilot phase of this programme variation in 2009. But the DFG will continue to turn to the study's key findings and use them to actively monitor the programme going forward.

4 Literature

- Bornmann, Lutz and Hans-Dieter Daniel, 2005:
Does the Hirsch-Index for Ranking of Scientists really work?
Scientometrics, 65 (3): 391-392.
- Geyer, Anton, Erik Arnold, Barbara Good and Leonhard Jörg, 2009:
Evaluation der Programmvariante SFB/Transregio, Bonn.



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