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# Drivers of Internationalisation: Results from the Evaluation of International Research Training Groups

*The process of growing internationalisation is constitutive of the research system. In Germany, the DFG is instrumental in shaping this process with its grant offerings. Its programme for International Research Training Groups places special accents within these funding activities. An evaluation of the programme, completed in 2014, aims to take stock of the internationalisation effects that have been achieved in the joint training of early-career researchers across borders. This Infobrief presents selected findings from the study. It looks at the motivation, outlook and experience of doctoral researchers, of the senior researchers who help train them, and of university managers.*

## 1 Background and Methodology

The evaluation of International Research Training Groups (IRTGs) was occasioned by the question: What internationalisation effects has this programme variation produced fifteen years after its introduction, given internationalisation trends in research that are strong in any case? The evaluation study, conducted by Anton Geyer, Florian Berger, Tobias Dudenbostel and Brigitte Tiefenthaler from the Technopolis research and consulting firm, was to identify these internationalisation effects in a systematic way and combine different methods and data approaches to answer questions of interest.

The analytical design of the study is based on the premise that internationalisation is not an end in itself, but that its purpose is to secure and gain scientific resources. In IRTGs we can identify three levels of stakeholders, each with different experiences and expectations regarding IRTGs and with different interests re-

garding the resources to be mobilised: doctoral researchers, participating senior researchers in Germany and abroad, as well as universities as applicant institutions.

The study combines quantitative and qualitative methods. A special focus is on interviews with members of the three stakeholder levels. A total of 83 guided interviews were conducted with individuals from these groups. In addition, decision papers of the Senate and Grants Committees (2013) for traditional RTGs and IRTGs were analysed for modalities and relevance of international collaboration. Moreover, CVs of 135 IRTG spokespersons were studied quantitatively in terms of individual experience, internationality, grant proposal and approval data, and data from the DFG's annual RTG monitoring.<sup>1</sup>

<sup>1</sup> The DFG conducts an annual monitoring of master data, in which information is collected on the researchers involved in the funded Research Training Groups and Collaborative Research Centres. These survey data on topics such as socio-demographics, the doctoral process, mobility and internationality go into statistical reports and inquiries on issues such as early career support and gender.

## Research Training Groups

The funding programme for Research Training Groups (RTGs) was first established in 1990. It aims to strengthen the position of doctoral researchers and the quality of their training through structured training groups, and to enable them to conduct independent research early on (DFG 2010). Research Training Groups have continually evolved. Today they are institutions, run by universities for a duration of up to nine years, that combine a thematically focused research programme with a structured qualification strategy.

## International Research Training Groups

International Research Training Groups (IRTGs) are a programme variation of Research Training Groups in which an RTG's research and training programme run jointly with a partner group abroad. This variation was introduced in 1997 as European Research Training Groups. Beginning in 2001 it was opened up to include collaborations with non-European partners and renamed International Research Training Groups. It involves systematic, close cooperation with a foreign research institution and mutual research visits by doctoral researchers lasting several months each. The foreign partners in IRTGs must provide complementary financing. Of the total of 253 Research Training Groups funded in 2013, 57 were International Research Training Groups.

Furthermore, exemplary bibliometric analyses were conducted on 13 IRTGs and 14 RTGs in the areas of biology and chemistry. These research areas are easy to investigate in terms of their publication practices; they are also disciplines with a strong international orientation in any case. Publication data for 452 senior researchers and 1,063 doctoral researchers in RTGs were compared statistically.

The following begins with a presentation of key figures of the programme. The subsequent sections describe the different perspectives and internationalisation effects for the three main groups involved. Finally, the effects are summarised and evaluated.

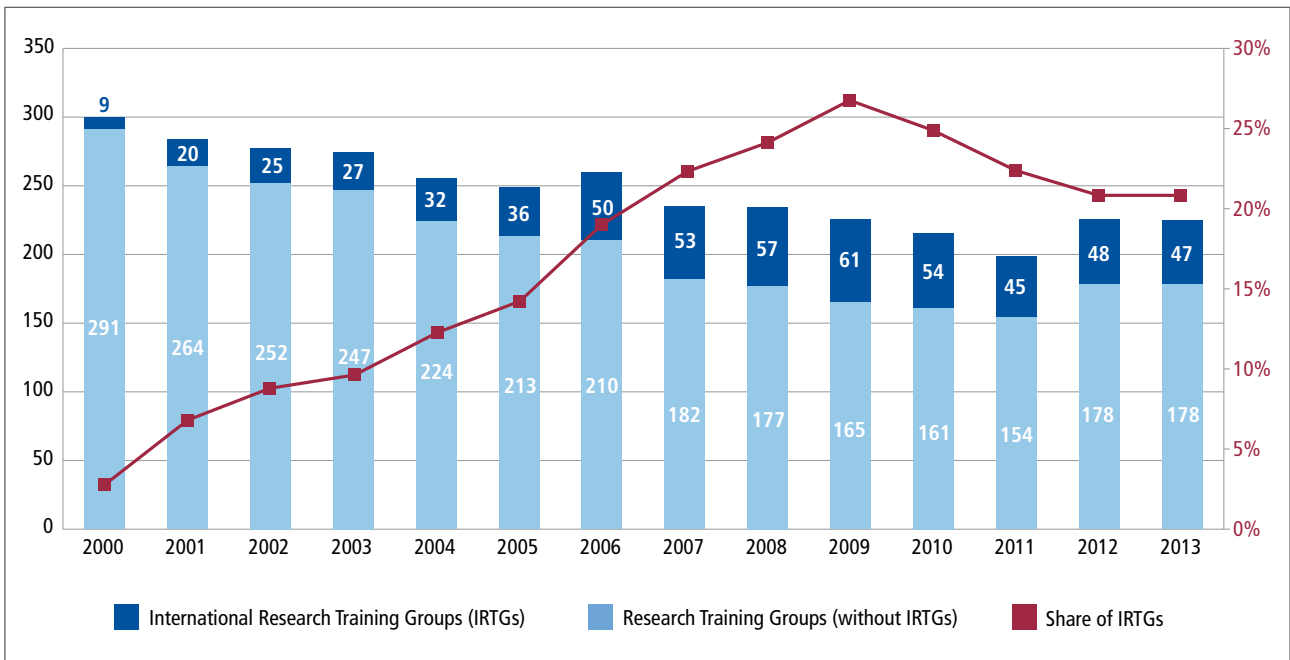
## 2 Funding Data for IRTGs and RTGs in Comparison

The following numbers show how the utilisation of the IRTG programme variation has developed in recent years, which countries are involved, and how approval rates and grant amounts differ between IRTGs and RTGs. From the introduction of the variation until the end of the reporting period, the DFG approved funding for a total of 101 IRTGs. The share of funded IRTGs grew con-

tinuously until 2009 and has since levelled off at about one-fifth of all RTGs (Figure 1).

When we compare the distribution of subject areas in traditional RTGs versus IRTGs, distinct differences emerge between scientific disciplines in terms of the utilisation of the programme variations (Figure 2). In the years 2007 to 2013, of 112 approved full proposals for traditional RTGs, 37 percent were in the humanities and social sciences, 21 percent in the life sciences, 24 percent in the natural sciences, and 18 percent in the engineering sciences. Of the 37 full proposals for IRTGs that were approved in those years, 43 percent were in the life sciences. The natural sciences were represented in 10 of the 37 approved IRTGs; 9 were in the humanities and social sciences, and only two in the engineering sciences. IRTGs seem to be especially attractive to the life sciences, whereas RTGs are dominated by the humanities.

A comparative look at approval rates, i.e. the proportion of approved versus all reviewed establishment proposals, shows that IRTGs at 53 percent have a slightly higher chance getting funded (RTGs = 45 percent). For renewal proposals, however, approval chances are somewhat lower at 71 percent (compared to 81 percent for RTGs). Over the last five years, IRTGs received on average 764,000 euros from the DFG per re-



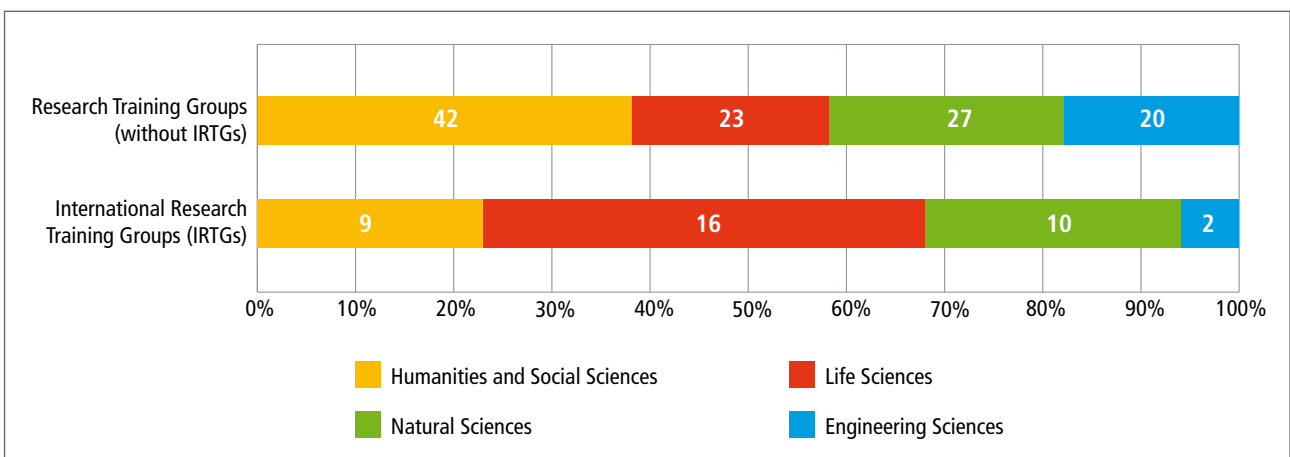
**Figure 1: Number of currently funded Research Training Groups as of 1 November of each year**

porting year, only slightly more than traditional RTGs with an average of 751,000 euros.

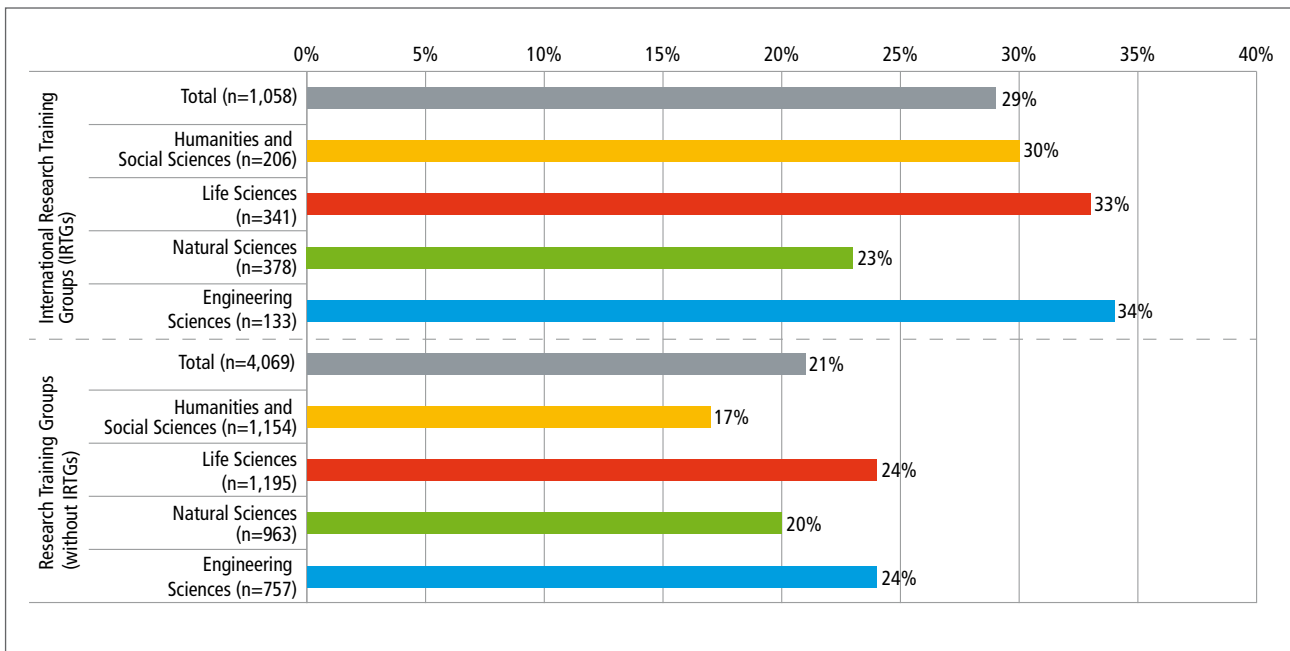
To date, partner institutions in 30 countries, including 17 European and 13 non-European countries, have participated in IRTGs. Within Europe, the most IRTGs were run in partnerships with institutions in the neighbouring countries of the Netherlands (15), France (13) and Switzerland (7). Outside Europe, the United States (13), China (7) and Canada (7) have been the most important partner countries in the programme. In some of these countries there are partner organisations with which the DFG has entered into agreements to jointly fund IRTGs.

While the share of foreign doctoral researchers varies by scientific discipline, it is greater in IRTGs than in traditional RTGs across disciplines (Figure 3). The difference is particularly stark in the humanities and social sciences. Among post-doctoral researchers, the proportion of foreigners is even more pronounced, with 52 percent in IRTGs compared to 34 percent in RTGs. That IRTGs appeal to a more internationally oriented group of early-career researchers than traditional RTGs is also borne out by the interviews.

Overall, comparison of the indicators shows that the initially rising demand for the programme during the first years has levelled out



**Figure 2: Number of approved full proposals by scientific discipline and programme variation, decision years 2007 – 2013**



**Figure 3: Percentage of foreign doctoral researchers by programme variation and scientific discipline**

for some years now. Remarkable are significant differences in the distribution of this type of programme across scientific disciplines. The differences between funding rates, however, turn out to be small. European and long-distance collaborations are roughly in balance. Within a large number of partner countries, there is a concentration on some particularly active partners, both outside and within Europe. Doctoral and postdoctoral researchers are more international in IRTGs than in RTGs across all disciplines.

### 3 Doctoral Researchers

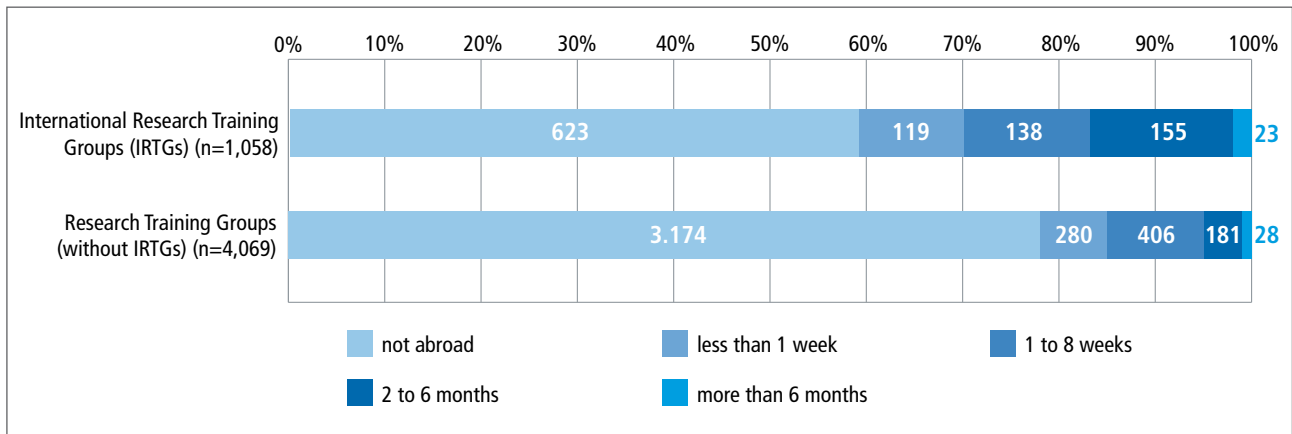
The main target group of IRTGs consists, first and foremost, of doctoral researchers who are to be guided toward independent research, an international orientation, and ultimately a doctorate. What motivates them to train in an IRTG?

The primary reason is their scholarly and scientific interest in a particular thesis topic. They also appreciate the structured form of the doctoral programme, with close links to other trainees that sometimes outlast the doctoral phase. In addition, however, the specifics of the IRTG programme provide a special incentive. Going abroad is seen as an opportunity for personal

and academic development. This is also confirmed in retrospect by postdoctoral researchers who obtained their doctorate in an IRTG and who see their participation in the group as instrumental to their career progression.

The duration of the stay abroad varies and depends primarily on its usefulness to the thesis project. Data from the monitoring the DFG Research Training Groups Programme show that during the reporting year 2012, more than 40 percent of doctoral researchers in IRTGs completed a research stay abroad (Figure 4). In traditional RTGs, conversely, only 22 percent did so. It should be noted that a stay at the foreign partner institution is not mandatory in IRTGs. Rather, the destination can be chosen flexibly according to the needs of the doctoral research project. The period abroad is used to focus problems, methodologies and investigative approaches. Doctoral researchers do not believe that the stay prolongs the overall training period.

Bibliometrics deals with the quantitative analysis of publications. The bibliometric analysis in the study presented here focuses on collaboratively produced publications and is limited to the areas of chemistry and biology. No conclusions can therefore be drawn regarding its applicability to other research areas. Fur-

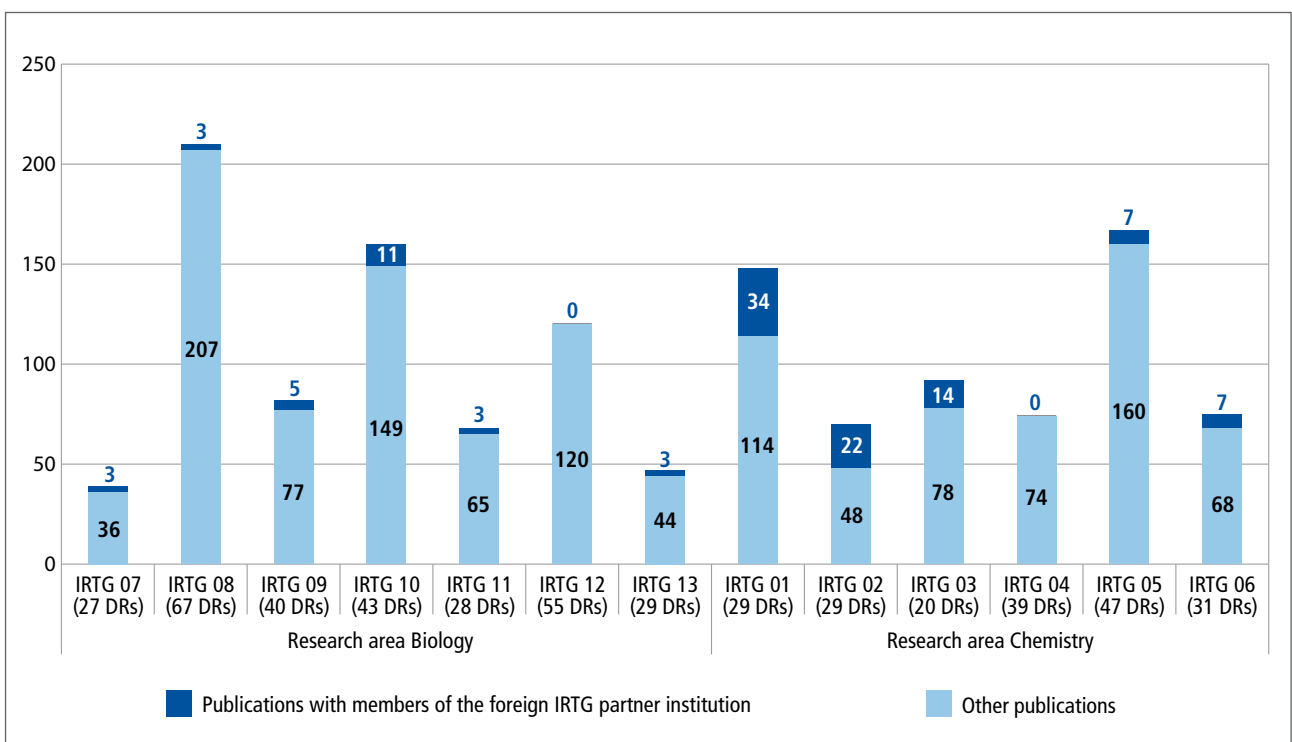


**Figure 4: Duration of stays abroad by doctoral researchers in reporting year 2012**

thermore, the bibliometric analysis covers only collaborations that culminate in a formal document, i.e. a publication. Informal collaborations and diverse interchanges, as they always occur in research projects, are therefore not included.

Of all publications released by doctoral researchers during the training period, the percentages that credit a co-author from the partner institution vary widely and are overall relatively low (Figure 5). A demonstrable personal benefit for doctoral researchers in the analysed IRTGs is a permanent collaborative and international ori-

entation. For IRTGs the share of joint co-publications with other doctoral researchers merely decreases from 32 percent to 23 percent in the following period, whereas is drops from 28 percent to 13 percent for RTGs. The data also suggest that IRTG alumni are slightly more likely to do additional academic work abroad (e.g. as postdoctoral researchers). After the training period, they certainly publish more often than their RTG counterparts as members of a foreign research institution (28 percent versus 22 percent publications with foreign affiliation). It



**Figure 5: Number of publications by doctoral researchers released during their IRTG membership jointly with members of foreign partner institutions, as well as number of their other publications in this period**

should be noted, however, that the effects of a stay abroad, such as learning a research method, are not necessarily reflected in a co-publication with the partner institution. In addition, there are other reasons, such as qualification requirements, why a doctoral researcher may be credited as the sole or first author even in publications that were produced in a joint research context.

Thus doctoral researchers in IRTGs demonstrate a strong international interest even before their involvement in the IRTG. They regard working on their thesis topic in an international context as an added value that helps them to hone investigative methods and approaches, and to establish an international and collaborative orientation for the long term.

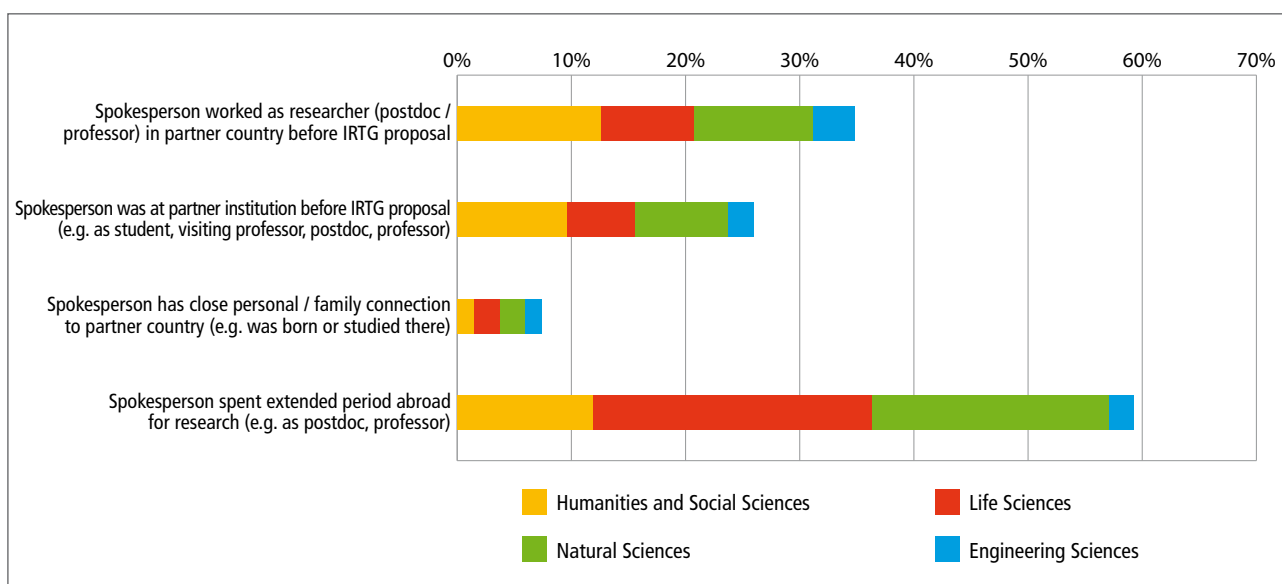
## 4 Participating Senior Researchers

This section looks at the question: What benefits and resources do the senior researchers who supervise the doctoral researchers expect to gain from IRTGs? They consider IRTGs primarily as an instrument of research funding. But apart from value added by (international) scientific cooperation, they also appreciate the visibility and reputation associated with an IRTG, which facilitates the

initiation of subsequent international collaborations, among other things. In addition, submitting an IRTG proposal is considered to be only slightly more involved than submitting an RTG proposal.

Occasionally, strategic considerations play a role in the choice of partner organisation. Predominantly, however, respondents say that partners are chosen for complementarity of research and reciprocal access to expertise, resources and methods. The exchange of doctoral researchers then mutually fertilises the scientific work. An analysis of the biographies of the spokespersons shows that the majority of them already had an international connection before proposing the IRTG. The most frequent reason for this is a history of research done abroad, rather than a family or biographical background in the partner country. Some of the spokespersons had already worked in the partner country or at the partner institution. But the crucial factor in most cases (59 percent) is international experience in the form of an extended stay abroad, although not necessarily at the partner institution or in the partner country (Figure 6). This pattern is most visible in the natural and life sciences, less so in the humanities and social sciences.

The survey of participating senior researchers at international partner institutions shows that



**Figure 6: Percentage of spokespersons with international experience and other connections to the partner country among 135 spokespersons of IRTG establishment and renewal proposals for grant years 1998 to 2013, by scientific discipline**

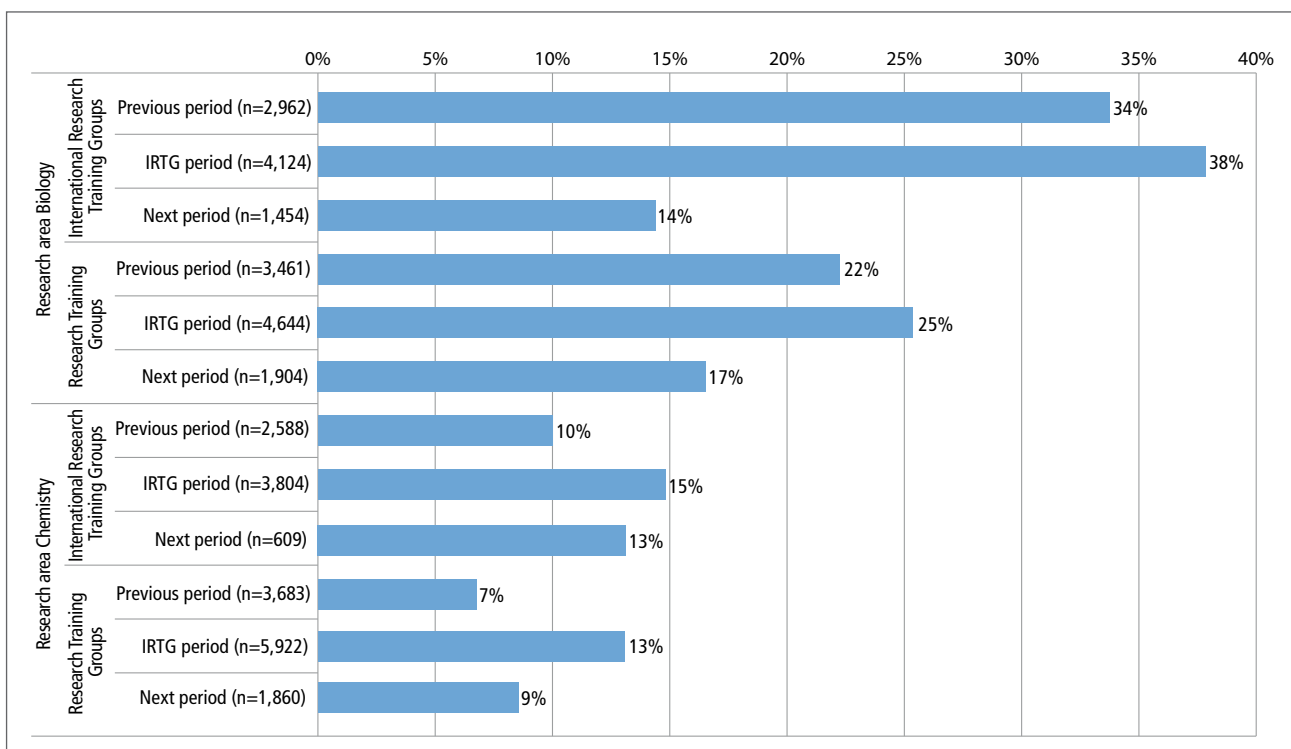
contacts and working relationships to a core team or to the spokesperson at the German institution were typically already in place at proposal time. Some of the foreign partners had already been to Germany as visiting researchers or Humboldt fellows. Other contacts were mediated by third parties or the DFG offices abroad. Need for advice arises especially as a result of the requirement of complementary financing by the foreign partner, which is not always easy to obtain due to different funding systems.

To what extent does cooperation at the senior researcher level result in joint publications with international partners? As with doctoral researchers, bibliometric analysis reveals that the percentage of co-publications by senior researchers with partner institutions is rather low as a share of the total number of their publications. In addition, the spokespersons are disproportionately more likely to be involved in such co-publications than other participating senior researchers. However, bibliometric analysis does suggest that IRTGs are characterised by more intense collaboration at the local level. At least in biology, the percentage of publications produced

by two or more IRTG senior researchers, as a share of the total publication output by these researchers, is higher than in the traditional RTGs (38 percent versus 25 percent for the duration of the group). To a lesser extent this difference is also visible in chemistry (Figure 7).

International partnerships do not always outlast the duration of the group. Collaborations may change their research focus and character, and/or continue under different funding programmes. Again, it should be noted that the scientific benefits for participating researchers may not always be reflected in joint co-publications. The vast majority of partners, both in Germany and abroad, report that the collaboration has been scientifically and personally profitable, and that it has enhanced international visibility.

Overall, the analysis of this stakeholder level shows that senior researchers perceive the IRTG primarily as a research funding programme and appreciate the international visibility associated with it. It plays to their international orientation and enables them to pursue research topics in a focused and collaborative way.



**Figure 7: Percentage of joint publications by senior researchers in RTGs and IRTGs as a share of all publications by participating senior researchers, by research area, programme variation and publication period**



## 5 Applicant Universities

What is the function of IRTGs for universities, and how do universities perceive them? Are internationalisation effects apparent? Interviews with representatives of universities' executive boards make clear that, at this level, IRTGs are understood primarily as an instrument of structural development and of funding for excellent research. Accordingly, all five universities whose executive boards were interviewed categorise IRTGs under "research" rather than "early career support" or "internationalisation". Nevertheless, IRTGs are also seen as projects that can be leveraged to strategically drive the internationalisation of the university. In particular, they are used to provide young researchers and postdocs with international experience early on.

From the university managers' point of view, IRTGs have helped to establish visiting researcher exchanges, summer schools and bilateral research projects as instruments of international research cooperation, increasingly making them the subject of cooperation agreements with foreign partner institutions. The utilisation and anchoring of such cooperative actions is not exclusively the domain of IRTGs: Analysis of decision papers for establishment and renewal proposals shows that even traditional RTGs increasingly implement some of these elements and generally place great importance on the international integration of their doctoral students. That said, international visibility is particularly associated with the IRTG "brand". According to the polled university managers, an IRTG is seen as a quality proof of the ability to cooperate internationally and can be leveraged to initiate further international collaborations.

A look at the distribution of funded IRTGs across applicant universities during the reporting period from 1998 to 2013 reveals that smaller universities were often able to raise much higher funding amounts than would be expected based on the total sum of all DFG grants. Examples include the universities of Saarbrücken, Bielefeld and Kaiserslautern. Conversely, some universities

otherwise highly funded by the DFG are under-represented in the IRTG programme. Especially at smaller universities, IRTGs seem to be strategically useful and attractive for the development of international visibility and of research structures this side of Collaborative Research Centres (CRCs) and other large-scope funding formats. In part, the programme is perceived as a leaner alternative to CRCs with the ability to create synergies even when personnel capacities at the site are insufficient for the larger network of a CRC. These analyses indicate that IRTGs build structure and can support an internationalisation strategy, even and especially at smaller universities.

## 6 Summary and Outlook

The evaluation study examined objectives and effects of the IRTG programme variation using extensive empirical analysis. Only some of the results could be summarised in this Infobrief. The study suggests that IRTGs make a specific contribution to the internationalisation of early career support and of the academic system as a whole. All three stakeholder levels – doctoral researchers, senior researchers and applicant universities – experience positive effects.

Doctoral researchers – the key target group of the programme – benefit in two ways from their IRTG involvement: On the one hand, they can take advantage of the usual characteristics of a structured doctoral programme (e.g. supervision and additional training options); on the other hand, they also benefit scientifically and personally from the opportunities provided by bilateral cooperation, especially in the form of extended research visits to the partner institution. Such research visits also do not appear to prolong the time-to-degree. Thus the value added by international collaboration is apparently obtained without exacting a higher "cost" from doctoral researchers.

Participating senior researchers want to leverage collaboration especially in order to tap additional scientific resources for their work. Accordingly, they view the IRTG format primarily



as an instrument of research funding. At the same time, the evaluation has also shown that the IRTG is well-established as a “brand”: Host universities see the IRTG programme as a suitable strategic tool to enhance their own profile, international visibility, and reputation. At least the higher proportion of foreign doctoral and postdoctoral researchers in IRTGs as compared to traditional RTGs can indeed be interpreted as a sign of greater international visibility. By introducing the IRTG programme variation the DFG was thus able not merely to respond passively to the research community’s demand for an international programme, but also to provide universities and researchers with a tool for actively driving internationalisation. This tool has been especially beneficial to smaller universities.

The internationalisation of science and research is a complex process and increasing in the German system of research and higher education as a whole. Even in traditional RTGs, programme elements such as stays abroad and research visits, aimed at increasing the internationality of these networks, are established by now. It is therefore not possible to clearly isolate the specific internationalisation effects of the IRTG variation against the background of generally increasing internationalism in research. IRTGs are distinguished from traditional RTGs not necessarily by more (let alone “better”) internationality, but primarily by especially intense and focused scientific collaboration. The DFG-appointed steering committee that accompanied the study has drawn up a set of recommendations for the future of IRTGs based on the study (DFG 2015). It calls for a more clearly defined presentation of the IRTG as a special format with an international dimension that, unlike a traditional RTG, centres on a specific, bilaterally focused form of cooperation. Accordingly, justifications for choosing this funding format should be held to a stricter standard, and the definition of “scientific complementarity” should be clarified. The bilateral structure with mandatory reciprocal financing on the partner side should be maintained as a core element.

The DFG will continue to examine how well International Research Training Groups achieve their main programme objectives, namely to combine excellent research with structured doctoral training and international cooperation. Within its funding portfolio, the DFG also remains watchful of the growing internationalisation in traditional RTGs and keeps an eye on the delineation between the two programme variations.

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