

A REGIONAL FUNDING ORGANIZATION FOR BASIC RESEARCH? UNCONVENTIONAL MISSIONS AND THEIR EVALUATION

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INTRODUCTION

In many OECD countries, the state funding for research has been transformed into a split funding mode that combines block funding for universities with competitive project grant funding. Consequently, research funding organisations (RFOs) have become obligatory points of passage for conducting research in resource-intensive fields. Grants from RFOs has also become embedded in institutionalised evaluations and have become a pivotal benchmark for the reputation of both research organisations and researchers.

Thus, RFOs emerged as central actors in innovation systems. In science studies, they are commonly conceptualised as intermediary organisations because they mediate between science policy (representing state and public interests), scientific communities and their priorities and standards, and researchers who apply for and receive grants in order to further develop their individual research agendas. RFOs are usually jointly controlled by the state and scientific communities (Braun 1993, 1998).

RFOs enjoyed significant attention of science policy and sociology of science studies which, however, focused their attention on state-level RFOs. It has been shown that the state depends on RFOs and other advisory organisations with intermediary functions to be able to govern science (Van den Daele et al. 1977, Guston 1996, Van der Meulen and Rip 1998, van der Meulen 2003). Principal-agent theory has been suggested as a theory that can explain structures of and processes in and around research councils (Braun 1993; Rip 1994; Guston 1996; Braun 1998; van der Meulen 1998; Braun and Guston 2003; Caswill 2003), but has been criticised for not being able to do justice to the complex embeddedness of research councils (Morris 2003; Shove 2003). The actual impact of RFOs on research was investigated very selectively, namely with regard to research quality (do RFOs select the best applicants?) and public policy goals (does RFO funding support the development of particular fields?), see Gläser and Laudel 2016.

RFOs that have a regional focus and thus are intermediaries between regional interests and scientific communities are less common. Examples for such regionally oriented RFOs are the Mercator-Foundation for the Ruhr area in Germany, the Einstein Foundation in Berlin, the Vienna Science and Technology Fund in Austria. The role of these regional RFOs as intermediary organisations has hardly been investigated. This neglect is due to a bias of science and innovation policy studies, which commonly

associate regional actors with interests in the application of research findings and technology development. A commonly accepted division of labour in the innovation ecosystem is that the nation state takes care of science funding while regional innovation policies are predominantly concerned with fostering transfer and innovation in economic contexts in those thematic fields that are considered of regional public interest. They address universities and other research institutions through their “third mission”, thereby seeking to push activities of research institutions “downstream” in the innovation chain and systematically neglecting the merits of “upstream activities” such as curiosity-driven fundamental research. Science policy studies mirror this interest by focusing on governance arrangements that support this aim (e.g. Feldman and Audretsch 1999, Rip 2002, Trippl and Maier 2010, Van Geenhuizen and Nijkamp 2012, Gertner and Bossink 2015).

At the same time, in many regions in industrialized countries basic research landscapes have emerged, i.e. concentrations of basic research that show a distinct profile, coherence, and synergies from local collaborations. Locality does indeed matter in that it enables collaborations depending on face-to-face contacts. After some initial attempts (Inhaber 1974), little attention has been paid to the benefits of co-location for fundamental research beyond some descriptive bibliometric studies (e.g. Hoekman et al. 2010). A bibliometric study of biotech research at the city level showed that new scientific topics in this field emerge where related topics already exist and others were more likely to disappear when they were weakly related to the scientific profile of the city (Boschma et al. 2014), indicating that a city's research amounts to more than simply the sum of its parts.

These two developments create a policy question and a corresponding research gap that can be described by the same question: How can a regional basic research landscape be developed? A more specific question, which is addressed by this paper, asks about the role RFOs can play in developing regional basic research landscapes. With this paper, we aim to contribute to closing this gap by answering the question how (by what mechanisms, with what effects) a small regionally oriented RFO can contribute to the development of a dense regional basic research landscape. We discuss the case of the Vienna Science and Technology Fund (Wiener Wissenschafts-, Forschungs- und Technologiefonds, WWTF). The paper is based on an evaluation of WWTF in 2013/2014, in which both authors were involved: Grit Laudel was part of the external expert group that evaluated the WWTF (Laudel 2013, Costa et al. 2014). Michael Strassnig is a Programme Manager of the WWTF and in that

role participated in the preparation and organisation of the evaluation (WWTF Office 2014).

The WWTF was established as a private non-profit fund in Vienna, whose mission is to strengthen the Vienna research landscape by contributing to the accumulation of critical mass of excellent scientific research in selected fields. It has been operating since 2002, and first effects of its work became visible after ten years.

Evaluating such a specific mission required a targeted micro-level approach. Comparative case studies were conducted in three selected research areas of WWTF funding activities, namely Life Sciences, Information and Communication Technology, and Interdisciplinary Mathematics. The case studies were based on semi-structured interviews with 25 grantees from all three major funding programmes who received WWTF funding. The interviews were prepared by bibliometric structural analysis of their publication oeuvre (Gläser and Laudel 2015; for more details about the methodology and methods see Laudel 2013).

1. AN INTERMEDIARY ORGANIZATION FOR A CITY'S RESEARCH

Vienna is a large research and innovation area with a total of 2.8 billion Euro annual spending on R&D of which 740 million Euro are spent for basic research.¹ It is by far the most important Austrian research landscape with nine public universities, four larger universities of applied science and almost all Austrian extra-university public research institutes. About 30.000 researchers and 180.000 students work and study in Vienna.

The WWTF was established in 2002 as a local RFO by the City of Vienna. As an intermediary organization it mediates between regional political interests, the local scientific communities and international scientific communities. This is reflected in its decision-making body (Board of Directors) and advisory board. The former consists of two WWTF officials, two representatives of the private banking foundation that funds WWTF, and two academics. It set the mission to "strengthen Vienna as a location of excellent research through funding projects and persons (WWTF Office 2014: 9). Two thirds of advisory board members are academics working in Vienna, the remaining third consists of municipal politicians (WWTF Office 2014: 10-11).

The mission of the WWTF is to promote research in Vienna by contributing to the accumulation of critical mass of excellent research in selected fields (WWTF 2008). To fulfil this mission, the WWTF has an annual budget between seven and thirteen million Euros. In addition, the WWTF manages funding programmes directly financed by the City of Vienna, namely the *Vienna Research Group for Young Investigators Programme*, the *Social Sciences and Humanities in Vienna Programme*, and a funding programme for university infrastructure.

As an intermediary organisation the WWTF has an unusual degree of autonomy. Although founded by the City of Vienna, it is not an agency of the municipal administration but a private non-profit organisation. Municipal policy makers do not interfere with the decisions of the WWTF beyond their role as members of the advisory board.

Funding programmes are designed independently by the WWTF, which constantly develops, adopts, and scrutinises ideas for new thematic areas. In its initial screening of ideas, WWTF applies two basic criteria. The proposed thematic area must be large enough to enable competitive calls, which means that it must overlap with research interests in a larger number of Viennese research organisations. Second, the scientific quality of Viennese research in this area must be well-above average. If these conditions are met, WWTF explores the specificities of the new field and possible impacts that can be achieved with different interventions by identifying and interviewing central actors including researchers and decision makers in relevant organisations. These findings from interviews are triangulated with a bibliometric analysis, interviews with experts from abroad (who are familiar with the research in Vienna but have no personal interests there) and data about locations abroad that are comparable in terms of quality, scope and scale.

The peer review of grant proposals involves the international rather than local scientific community in order to prioritize research quality and to exclude particularistic local interests (WWTF Office 2014: 20). The process is managed by the WWTF office who organizes written reviews and local meetings of international panels.

In these procedures, the local scientific and political interests are present in the WWTF's mission and boards, while the scientific profile and design of interventions is under the authority of the WWTF, and funding decisions under the authority of the international scientific community. Under these conditions, the strategy of an RFO becomes the decisive factor for its contributions to the dynamics of a research landscape.

Small RFOs operate in a complex research funding ecosystem that includes large and comprehensive RFOs. They have the disadvantage of needing to achieve effects with relatively small budgets. At the same time, they have the advantage of being able to design very specific interventions. Large publicly financed RFOs must balance a huge variety of interests involved in a national innovation system. These include the balance of targeted and researcher-driven funding, funding of a variety of collaborative forms of research, funding basic and application-oriented research, considering regional proportions and keeping national career patterns healthy. Smaller RFOs, on the other hand, have more freedom to set their agenda, particularly when they are as independent from political interests as the WWTF currently is.

The main strategy of smaller RFOs often consists in finding gaps in the funding portfolios of larger players and funding topics and/ or research with particular properties that would not find funding otherwise. Finding gaps has little to do with finding niches because the idea of niches implies protected but unimportant areas. However, since even large

RFOs cannot do everything that should be done, small specialised RFOs can target critical areas that are neglected by larger RFOs.

When it was founded, WWTF decided not to go the avenue of funding applied research or R&D as there were already a number of national and regional funders. Instead, basic research of high scientific quality that can contribute to the dynamics of the Viennese research landscape was made the primary focus. Current funding priorities target the life sciences (since 2003), interdisciplinary and applied mathematics (since 2004); a programme for information and communication technology that

focuses on basic questions of that field (since 2008), and cognitive sciences (since 2009), a newly interdisciplinary field with potential to connect areas of research in Vienna that have not yet been linked. The WWTF has a portfolio of instruments for research funding in these thematic areas, which include larger project funding as well as person-oriented funding of young group leader positions for 5-8 years ("Vienna Research Groups", abbreviated VRG), and fixed-term professorships ("Science Chairs"). Table 1 lists the programmes whose effects were investigated by the qualitative study. The majority of funds (75%) goes into Project Grants.

| | Project Grants | Endowed Science Chairs | Vienna Research Groups (VRG) |
|------------------|----------------------|--|--|
| Funding duration | 2 to 4 years | 5 years | 5 years |
| Amount | 200,000- ca. 800,000 | 1,5 million plus matching university funds | 1,5 million plus matching university funds |
| Target group | all | established researchers from abroad | early career researchers from abroad |

Table 1: Characteristics of investigated funding programs

2. HOW TO CHANGE A LOCAL RESEARCH LANDSCAPE

Since it is embedded in a supranational, national and regional innovation system, the support of scientific research by such small funding programmes faces a number of challenges. First, one can ask how a funding organization with limited resources can contribute to the development of a research landscape that is also addressed by much larger players. Second, as it is by no means easy to determine the success of such efforts: How can efforts to 'develop a research landscape' be evaluated?

The answer to the second question is based on the insight that any organisation should be evaluated against its mission. The qualitative study on which this section is based therefore looked for mechanisms triggered by WWTF funding that changed the Viennese basic research landscape. We found three such mechanisms.

1. CREATING LINKS AND EXPANDING STRENGTHS

A first mechanism utilises existing strength of the Viennese research landscape and links them to fields to which they have not been previously linked or expands them in new directions. This mechanism targets specific interdisciplinarity, either between basic research fields or between a fundamental and an applied field.

The WWTF issued several calls which, while thematically still sufficiently broad, asked for particular combinations of fields. The criterion interdisciplinarity is a means for combining existing research in a new way. For example, the thematic area "mathematics and ..." was created to encourage projects that apply pure mathematics in other disciplines (e.g. utilization of an innovative mathematical method in modelling and simulation). Vienna has a long tradition in formal mathematics. However, the WWTF observed that this tradition was not linked to the wide set of applications in need of such solutions. The call asked for projects to be conducted by interdisciplinary teams consisting of one applicant from mathematics and a partner from another discipline or vice versa. The pro-

jects should not just apply innovative mathematical methods but develop them further (WWTF 2008: 30).

An example for linking fundamental and applied research is the thematic call within the life sciences "linking research and patients' needs". Proposals for hypothesis-driven research aimed at strengthening links between basic research and clinical/disease-related research were invited to foster collaborations between basic scientists and clinicians.

The calls thus identify themes that fit the Viennese research landscape and create links between fields by demanding collaboration with partners from other fields in Vienna.

Well, there had to be opportunities for collaboration. This was a very, very important part of the WWTF proposal indeed, to show why this special person is able to interact with thousand and one people at the university. (Science Chair)

This selection process has to keep a balance. On the one hand, thematic areas need to be broad enough to attract enough applications. On the other hand, they have to be sufficiently focused to have a specific effect with limited funding.

In the light of limited funding, the sustainability of effects achieved with project funding is of particular interest. When new links are created by project funding: do they persist after funding runs out? The WWTF's application procedure for person-centred grants ensured that the candidates provided convincing research programmes, namely long-term plans for research.

Q: For how long is this planned? Is this now a lifelong project or ...?

A: Infinitely, yes. The fact is that you find something and then you have the next ten questions. And then you find again something, and then the next ten occur. [...]

Q: But the title [of the grant] ...

A: ... will stay for a while, I am pretty sure.

Q: A while would be decades?

A: I think so because it is a large concept. And it would need a really new finding that one suddenly moves somewhere else (LS, VRG)²

Q: These [...] research topics – for what time horizon are they designed?

A: [...] actually they are designed forever. [...] This is nothing you can finish in five years. Of course there are always intermediate goals. One wants to publish and this is why the projects are planned in small chunks. But the overall idea is planned to be very long-term. (LS, VRG)

Such long-term plans are more common for the life sciences. Many collaborations in these fields that were triggered by WWTF funding continued beyond the funded project. In these fields, in which lines of research consist of sequences of projects requiring similar combinations of expertise, WWTF funding from all three funding programmes helped researchers expanding their collaboration network.

Long-term research plans were also expected from VRG leaders in computer science as part of their application for WWTF funding. However, in computer science and mathematics the same methods can be more easily applied to new problem areas, and research programmes are likely to change much faster:

Also, the duration of the project is planned for five to eight years. However, when it approaches later phases the project description is of course vaguer because it is very difficult to plan research so far ahead. I can hardly promise what I will do in eight years because it can change very quickly. (IT, VRG leader)

Many projects in mathematics and informatics are 'isolated' in the sense that they have well-defined ad hoc – relations to other fields and don't generate new problems when solved. This is why WWTF-funded projects in these fields did initiate new links but these links were not sustained after the initial problem was solved.

Overall this WWTF Call was very important to our research group. However, you could say that the project lasted three years and we essentially did what we planned in the proposal. (MA, Project Grant)

Still, in some cases, the new projects built on ideas that emerged in prior WWTF-funded projects.

This [...] in a sense emerged suddenly. We didn't anticipate at the time [of the application] that this would become our main research area within information [...]. (IT, Project Grant)

Only researchers who could secure a permanent position and acquired grant funding from other sources as well as infrastructure support from their universities could maintain their new line of research. Several

other researchers intended to continue their research from WWTF Project Grants but couldn't due to the lack of funding.

Well, this clinical matter is of great interest to me, the clinical trial. That would be an important matter which can't be realised due to the lack of funding. (LS, Project Grant)

What happened with the project? It found some resonance [...] in the community. That's the one thing. The other thing is, of course there are follow-up questions that we would like to do. Two of them we would have taken up. One follow-up project that we tried to get funded is not yet funded, unfortunately. (IT, Project Grant)

The sustainability of research plans that evolved on the basis of WWTF funding crucially depends on continued success in acquiring external funding, which the WWTF cannot influence.

2. ATTRACTING THE (POTENTIAL) ELITE

National science policies in many countries try to attract outstanding scientists to their science systems because it is feared that the vitality of their science system is threatened by a brain drain. The underlying assumption is that the elite is critical to a nation's science base because they shape the direction of the knowledge production of their community (Mulkey 1976; Laudel 2005). Attracting the potential elite is important because they are more likely to stay and will become the new elite if provided with the right conditions. Furthermore, elite production is autocatalytic: The scientific elite selects and directs early career researchers in particularly promising research areas and increases the likelihood that these researchers become elite themselves (Mulkey 1976: 446-454, Zuckerman 1977: 99-100, Laudel 2005). Using special funding measures to attract the elite, as has been done in many countries (Laudel 2005: 377), seems to be rational. But how can they be attracted in a sustainable way, namely make them stay and having a long-term effect on a region?

The WWTF uses its funding programmes to fund professors (Science Chairs) and junior group leaders for this purpose. The candidates had to come from abroad, which made it more likely that new research areas could be brought to Vienna. Apart from that, quality and fit are the main selection criteria. This means that new research areas could only be established where "something was already there". In many research fields, the opportunities to collaborate locally are an important condition which makes a research site attractive.

There is in Vienna simply ... and there is always even more where you say, well we could, we should, let's do it. And the opportunities to collaborate are larger than what you have time for. Which is, of course, also a pleasant situation. (Science Chair)

And this [the data] you need to [analyse] cleverly and efficiently, and this is what we are currently doing a lot. And the good thing is, one has to say, it happens here because this campus is modern since people have access to these technologies the moment

1 Quotations are linked to the type of the grant the interviewee held (VRG leader, Science Chair, or Project Grant), and to the discipline (LS = Life Sciences; IT = Information and Communication Technologies; MA = Mathematics). If it is likely to make interviewees identifiable, even this information is omitted.

they are on the market. And this is why we are in the frontline of it. [...] It is good to have the people close by, to be able to talk to them and ask whether this makes sense, whether this is a meaningful result. ... Communication is really important. (Science Chair)

Many of these new collaborations of incoming elite scientists linked them to researchers in Vienna. On first glance, this looks suspicious because researchers generally search for the best collaborators regardless of their location. However, the discrepancy can be explained by the selection of applicants that fit the Viennese research landscape. Since the candidates had to come from abroad and to fit in the local research environment, new local collaborations are very likely to occur. Furthermore, local collaborations are advantageous for many research processes because they can be based on face-to-face communication. Thus, the simultaneous requirements of recruitment from abroad and local fit also made WWTF grantees in the Group Leader and Science Chairs programmes restructure their collaboration networks and tie them into the local research environment.

Candidates for professorships and for group leader positions also actively shaped their research by selecting research that both interested them and could be linked to the Viennese research landscape.

I think I visited here once more, but then there were some quite intense discussions about what [researchers in the university] were doing, what I was doing. And there we tried to find the cross links between what I thought was important in the projects that I wanted to do, indeed it is a continuation [...], the [topic 1]. [Topic 1] of course is something that has always interested me so that was more of a continuation. [Topic 2] was something that we were just a little bit getting into it. It was typically one of the things that I really wanted to do but couldn't do [at my old university abroad], I wasn't able to really focus on that. We were able to start with it but we couldn't get really much worth it. That was something that I really wanted to develop more. (LS, person-centred grant)

Since universities have to commit themselves to supporting the Chairs and group leaders (see 3.), which includes long-term investments in their respective fields, they will attempt to reap the greatest possible benefits from appointments, which includes a fit between the candidate and their own research profile. The following two quotes illustrate this 'strengthening through fit' mechanism:

I found here that there was this other group doing sort of similar kind of work that was very nice. [...] there are various groups who are doing related kind of research in Vienna. There is quite a team of this and we are doing monthly seminars. Tomorrow we have one with these groups where we meet and where we talk to each other and that is I think also very special. [...] (Science Chair)

I think the WWTF was very conscious that they employed somebody who would not come with a completely new thematic area but, while contributing a new aspect, does not create something completely new here. I find it far-sighted that they employ

people who simply fit, strengthen the whole thing and bring in even more critical mass. (VRG leader)

We have seen that the WWTF is successful in attracting excellent researcher. But how can it make sure that the researchers that were attracted through WWTF funding stay in the Vienna research landscape? Even if universities were included in the selection process of candidates (see 3.) and therefore willing to provide tenure, it is still a decision of the individual researcher whether he or she wants to continue his/her career in Vienna.

Nearly all WWTF Science Chairs were appointed to tenured positions and have remained in Vienna. One Science Chair left and took a position in Switzerland. The careful selection process and the considerable resources provided by universities create a sufficient incentive for most Science Chairs to stay on and thus ensure the sustainability of changes in the Viennese research landscape. All members of the first cohort of Vienna Research Group Leaders also received tenured positions. For the recent cohort this is still an open question. Furthermore, in contrast to the Science Chairs, the group leaders' future position come with very little funding beyond their own salary.

I mean, if I get tenure then I believe they should give me something additional, a position I guess. Otherwise I will apply somewhere else. It is not at all common that you get a professorship and nothing else than your own salary. (VRG leader)

This is a problem in fields like the biosciences, where personnel is essential for conducting research. If the WWTF made the right decision in selecting and funding these group leaders, they may receive more attractive offers from abroad when the funding period ends. In other fields where group leader positions were established, we can be more confident that at least some of the established research programmes will be continued in Vienna.

Another important condition for interviewees was having a career perspective leading to a full professorship in due time. This was considered important not only because it extends one's own resource base but also because of the authority of the position:

One is then in a position where you can begin to influence which further professors a university recruits and so on. Just from the point of the career this is a different state where you can start to shape things more closely.

The WWTF intends to attract the potential elite of a research area, and these researchers naturally want to do what the elite does, namely to shape the direction of their scientific community's research both locally and globally, as the quote above shows.

The effect of Project Grants on creating sustainable careers were less strong. Project grant holders on temporary positions did not have clear career prospects. Austrian universities provide only few tenure-track positions that lead to assistant professorships and finally to associate professorships.

Any planning of a career in Vienna is difficult. I have built some-

thing for me. I created a momentum and I would like to continue. But it is not possible that you can stay if you have achieved this and that. This is just not possible. And this is a big gap. [IT, Project Grant]

As a result, some of the WWTF grantees who received excellent offers from abroad but wanted to stay in Vienna did not find an opportunity to do so. Project grants could also have an indirect effect by increasing an early career researchers reputation and this way facilitating later achievement of tenure (however, not necessarily in Vienna).

3. 'NUDGING' RESEARCH ORGANISATIONS

The VRG Leader and the Science Chair programmes depend on the active participation of universities, which are involved in the application process and must make significant contribution in order to receive the funding for VRG Leaders respectively Science Chairs. The funding commitments were substantial in the case of Science Chairs and moderate in the case of VRG grants. A second, more important commitment expected from universities was the creation of tenured positions. While the positions of VRG Leaders and Science Chairs are funded for a fixed term, their host universities have to provide a tenure-track position for VRG Leaders, and have to establish a chair in the field of a Science Chair after their term. These commitments provide the WWTF grantees with an opportunity to move to permanent professorships and to continue their research in Vienna. This means that with its temporary funding, the WWTF leverages not only matching temporary funding from the university but also permanent investment in the fields in which the WWTF funding flows.

Since universities have to make considerable financial commitments to support the chairs and group leaders, and must commit to long-term investments in the fields of Science Chairs, they will attempt to reap the greatest possible benefits from the appointments. This is why they are concerned with the candidates' fit with their own research profile, either through strengthening existing research areas (which always coincided with the addition of a new area of expertise) or through filling important gaps in their profiles (see 2.).

The excellence of the funded professorships attracted other excellent researchers in the same research field. The initial WWTF funding acted as a trigger and created critical masses that made some areas internationally recognised strengths.

At this moment, this really is the best location for me in Europe, I think. Which also had to develop, of course. [...] This research focus [...] in Vienna is even stronger today than at the time when I came here. Some credit for that must be given to the WWTF. [It] was – with some additional luck – sufficient to establish an internationally visible research focus in Vienna. In [that area] it is simply the case that there is no better place in Europe. (Science Chair)

Even in the case of the Science Chair who left Vienna the WWTF had an impact on the research landscape because two Viennese universities decided to continue the Chair's research area by establishing their own chairs in this area (with some support of the WWTF).

Universities also created new tenure-track positions in the research areas of two Science Chairs. How such positions can be filled depends of course on the attractiveness of the Viennese research environment. At least in some cases, the Science Chairs contributed to this attractiveness.

For example, Professor X and Professor Y both came to Vienna after me. I wouldn't say it was essential that I am here but it certainly helped. The people, the famous people move where they find colleagues for whom they perhaps have some use. This is an important matter. (Science Chair)

Also at the same time someone else came, not from WWTF but from other funds. A few new groups came and this established in a way also a core of [...] sciences where I think that we have actually a very nice surrounding of the field here in Vienna at hand. [Science Chair]

The 'nudging' of research organisations, which has already proved highly successful in the case of Science Chairs and still awaits its test for VRG Leaders (the VRG programme started only in 2010), extends the WWTF's influence on the Viennese research landscape far beyond its actual funding by enrolling research organisations. It is, however, not without limits. The WWTF cannot influence the future resource base of its grantees. For VRG Leaders, this entails the possibility of moving from the position of a leader of a well-funded research group to the position of a university-financed associate professor, who receives very little resources in addition to the funding of the position itself. This is why many group leaders begin to apply for additional grants rather soon. Some WWTF grantees boosted research in their area by attracting additional funding through external grants. They also attracted people who joined their groups who brought their own funding with them.

And then the person who became my first postdoc contacted me spontaneously. He knew me from scientific meetings. He said, 'hey, maybe you are looking for a postdoc'. Then we agreed that he would come, would be funded [for some time] from WWTF, and that we would apply for a fellowship, which he received. Then another postdoc came, a very good scientist who got her [...] fellowship. And then somebody else whom I knew from meetings asked me 'are you looking for postdocs'? [...] It all worked very well indeed. (VRG)

However, success is not guaranteed. Such a prospect is particularly disheartening in the experimental fields. Science Chairs are in a similar position because the university cannot make any promises in terms of resources and personnel for the chair prior to the actual negotiations during the appointment procedure. Thus, WWTF grantees in both programmes can be confident about having a long-term perspective in terms of their position but face insecurity concerning their future research base.

3. CONCLUSIONS

The WWTF is a small RFO that is unusual in that it aims at contributing to the development of the Viennese research landscape and its fundamental research. Regional science policy actors exercise only little authority. The WWTF designs funding programmes according to thematic fit and impact of instruments, while the international scientific community is strongly involved in decisions on funding. Local scientific communities and their interests are balanced with international research communities both in the creation of thematic priorities and in the administration of calls.

In spite of its small budget, the WWTF did indeed have an impact on the research landscape of the City of Vienna. We identified three major mechanisms through which this impact was achieved. First, *creating links* and expanding strengths resulted in thematic programmes that were connected to existing research and brought in new research topics. This is in accordance with the findings of Boschma et al. (2014) that a topical link must exist to make a sustainable regional impact. Attracting the (*potential*) elite to fill the selected fields is the second mechanism. Researchers from abroad were offered generously funded tenure-track positions (junior group leader and professorial) if they met the criteria of excellent quality and fitting into the research landscape. Third, *'nudging' research organisations* means universities could receive substantial funding by the WWTF for group leaders and professors if they committed themselves to contribute matching funds and provided tenured positions for the period after the RFO funding. It 'nudged' universities towards supporting new topics because the authority in the application process was shared between the international community, the RFO and the respective university. This led to sustainable investments and in some cases to the creation of critical mass.

The WWTF is to a large extent focused on *bending academic careers*. Careers are bent thematically by focusing them on unusual cross-disciplinary relationships. At the same time, they are bent geographically by attracting and binding them to the Vienna science region.

How sustainable is this impact on the regional landscape? Since the WWTF has been operating for only a decade, this question is difficult to answer. Some tentative conclusions are possible. WWTF-funded professors are likely to continue their careers and research in Vienna. This particularly applies to those whose WWTF funding ended and who are on university-funded positions with substantial research funding. For the potential elite, the junior group leaders, sustainability is still an open question. Although all members of the first cohort have received a tenured position, these positions do not usually include substantial additional funding, which means that they might respond to attractive offers from abroad. The sustainability of careers of researchers funded by Project Grants largely depends on other actors in the region, particularly other RFOs. Thus, the more serious constraints to the WWTF's funding strategy appear to be outside its control. The WWTF provides generous funding that enables interesting research but does so only for a fixed term.

Inevitably, there are some risks to these approaches. One that has not manifested itself yet but was suggested in one interview is that with its search for unusual calls, the WWTF runs the risk of offering something

for which there is less demand, or demanding something that researchers can hardly deliver. This risk is inevitable for a small RFO that needs to capitalise on gaps in larger RFOs funding portfolios. The same logic that applies to research applies to research funding: RFOs must risk something in order to achieve something. It is not easy to see how the WWTF could achieve the same impact with a low-risk strategy.

We have provided a micro-level analysis that identified mechanisms triggered by an RFO in order to produce macro-level effects on a region's research. However, we were not able to identify these macro-level effects. While there is agreement in the science policy literature that local and regional research landscapes are important contexts for research, the empirical investigation of research landscapes, and particularly of their thematic structures, is still hampered by a lack of suitable methods and data. It is still not clear how quality, thematic structure, epistemic diversity and coherence of a regional research landscape can be measured. The approach of choice would be bibliometric methods, possibly combined with network analysis. However, such an analysis would require the generation of complex data sets and is thus a question of the cost-benefit ratio. But even when we will be able to measure an RFO's impact on a regional research landscape, there will be substantial impacts which will defy quantitative detection as the dynamics of research cannot be represented in rather fixed denominations and categories of research output.

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JOURNAL

for Research and Technology Policy Evaluation



ISSUE 41 | MARCH 2016

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PHILIPP

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