Thesis

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International Science Policy of Hungary at the Beginning of the 21st Century

PhD dissertation

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1. Introduction of the topic, research questions

Global challenges of the 21st century cannot be resolved by single countries or single disciplines. Scientists and other members of the scientific community often work beyond national boundaries, beyond the traditional borders of their scientific disciplines, and beyond the sector of academia itself in their attempts to respond to such challenges.

Science policy is often faced with the choice between two mutually exclusive positions: either scientific progress is an autonomous, bottom up process driven by the unhampered curiosity of autonomous individuals working on topics of their own choice, or scientific progress is driven by national governments in a top-down fashion making goal-oriented interventions, steering and managing scientific progress in pre-determined directions, usually set by civil servants employing the tools of limited national funds dedicated to a limited set of goals. However, in actual practice these two approaches are likely to complement rather than mutually exclude each other. Within this wider context of a non-exclusive approach to fundamental and applied science, the task of national science policy seems to consist of providing robust and consistent but at the same time flexible framework conditions for setting research priorities and allocating budgets.

Nation states are increasingly more often not only inclined to compete for power by trying to extend their physical territory, but they also

compete for the means to create more wealth and social well-being within their territory. In this specific area of competition, science and technological innovation is seen as one of the most prominent and effective means to increase the competitive edge of a nation.

Studies on international science policy in Hungary in the last decades are thin on the ground. Most existing research in Hungary is focussed on blending in with European Research programmes and the country's intermingling with European programmes. Working in the field of S&T policy over the last 15 years I have been in close contact with the interactions between bilateral and multilateral schemes, programmes and policies.

After a turbulent political history and the changes this history inflicted on science policy issues, Hungary's accession to the European Union has had a substantive impact on its bilateral international scientific cooperation and policy, in which even national science policy has been adjusted to EU schemes: both competition-based participation in European framework programmes as well as nationally available funds on the back of European Structural and Investment Funds are managed with European priorities in mind.

Hungary's EU membership also changed its cooperation with its traditional partners in bilateral alliances. Since its accession, Hungary has not longer been considered as a country in transition in need of additional support, but instead it has been viewed as a partner on an equal footing with the rest of the EU Member States. Most EU

Member States supplement their existing bilateral cooperation agreements with European schemes, which can effectively be used for networking and cooperating within Europe. Furthermore, the European Research Area offers the guarantee of free movement for researchers. One of the consequences of all these and similar developments is that Hungary, in line with most of the other European Member States, allocate most of their non-EU resources to bilateral activities with third countries outside of the European Union.

I illustrate the various ways in which Hungary continues its bilateral relations by three typical examples, one with Austria – mobility funding, another with Germany – European programmes, and a third one with Turkey – joint research projects. I discuss why these bilateral relations remain important even after Hungary's accession to the European Union. I have chosen these three countries for a number of reasons. My first example is Austria, Hungary's neighbouring country with a comparable size and population, because of its above-average performance and success-rate in European Union programmes. In this, Austria has the potential to serve as a role model for Hungary. My second example is Germany, because it has the highest GERD in the European Union, and the largest number of successful applications in European framework programmes together with Hungarian scientists. And finally, I have taken Turkey as an example because it has not yet achieved the status of full membership of the European Union, and because of its associated member status to EU research framework programmes it can be regarded both as a European country and a third country at the same time.

The dissertation aim to answer the following three research questions:

(1) Which institutions and actors are involved in, responsible for, and interact in setting the agenda of Hungarian and European science policy?

(2) In what way do international political events have an impact on national science policy with special regard to Hungary's membership of the European Union?

(3) How, after Hungary's accession to the European Union, do the main forms of bilateral scientific cooperation benefit from, adapt to, or are resilient to the European setting?

2. Methodology

In this thesis, I use a mixed approach of quantitative and qualitative research methods. After the introduction, in the second chapter I set out the theoretical background by defining science policy and related concepts, which is followed by a brief analysis of secondary literature relevant to the topic at hand. I also introduce a number of theories, *viz*. the principal-agent theory, the OECD model for science policy management, and the research agenda setting role of policy entrepreneurs, that I use in later chapters to analyse the institutional setting of Hungary in different historical periods. Recently emerging research fields focusing on science and technology, like Innovation Studies, Science, Technology and Innovation (STI) policy research or Science and Technology Studies are also covered in this chapter.

In the third and fourth chapter I describe the history of science policy in Hungary based on some standard works of reference with special emphasis on the impact of decisive political events on Hungary's STI system. A separate chapter, the fourth, is devoted to the developments after the systemic change in 1990. In these two chapters I compare the institutional setting and scientific landscape of different periods based on the principal-agent theory and the OECD model. I also interpret the role of policy entrepreneurs, decisive figures, documents and historical events on science policy. By comparing the programme portfolios of various research management bodies, I show the strong path dependency of the research funding system in Hungary. I analyse recent STI indicators to explain why Hungary is a moderate innovator, still lagging behind in the European competition.

My main contribution to the current debate is to be found in the chapter about international science policy in Hungary in the 21st century. In this fifth chapter I compare policy objectives for international scientific cooperation, describe the content of bilateral S&T agreements Hungary signed with Austria, Germany and Turkey, and provide an overview of the science attaché network of Hungary. I then discuss the main features of Hungary's participation in European framework programmes, not only in itself but also in comparison with the Austrian, German and Turkish examples. Finally, I set out three different forms of bilateral cooperation between Hungary and the three for this thesis selected partner countries.

In this chapter I use various analytical methods. I analyse policy documents, agreements, and international strategies. I analyse the results of two surveys on relevant science policy issues I have carried out: one with current and former Hungarian science attachés, another one with Hungarian scientists who have submitted mobility projects with Austria. The questionnaire sent to science attachés was joined by semi-structured interviews. I give an analysis of OECD and eCORDA statistics so as to compare the participation of Hungary, Austria, Germany and Turkey in European framework programmes. I set out three case studies of the history and current forms of bilateral cooperation between Hungary and the three for this thesis selected partner countries.

3. Results

The main conclusions of the dissertation can be summed up under three headings referring to the research questions of the thesis.

3.1 Setting the agenda of international science policy in Hungary and in Europe

The thesis describes all the institutional reorganisations and their effects on the Hungarian scientific environment in detail. In spite of all the efforts at modernisation and reorganisation, both the institutional landscape and the programme portfolio of responsible organisations have hardly changed after the systemic change. However, constant uncertainty, lack of stable funding, frequent change of rules and regulations have had a detrimental effect on the

scientific environment, especially on international cooperation, an area in which partners from abroad have in their turn also been subjected to national procedures. Hence, long-term stability, reliable institutional and funding environment would be amongst the most important preconditions for improving the efficiency and impact of Hungary's scientific actors.

As of June 2018 the main organisation responsible for science policy in Hungary was the National Research, Development and Innovation Office (NRDIO). NRDIO conforms to the ideal public model as described by the OECD in that it is responsible for planning, priority-setting, budgeting and administration, and in that it launches and manages scientific calls for proposals in line with the priorities set by itself, which are financed by NRDIO's own budget.

The Hungarian RDI landscape represents a less than ideal picture if we analyse it based on the model of post-modern research systems. Instead of adopting the principles of dialogue, cooperation and trust between government and scientists, the current mechanism of operation of NRDIO is rather characterised by very detailed and strict regulations, strong intervention tight control and supervision.

From the point of view of the principal-agent game theory, the Hungarian case can be considered as a double principal-agent game. In the first game the Hungarian government is the principal, whilst NRDIO is the agent. The principal is interested in evidence based planning, effective management and payments according to tight

time-tables. The agent has to comply with these requirements put down by the principal, because its mere existence is not independent of the principal. This first principal-agent relationship also has an impact on the second game in Hungary's double principal-agent game model. In this second game, in which NRDIO is the principal and the Hungarian research communities represent the agents, NRDIO as the principal has a clear preference for monitoring over trust, and compliance with its rules over bending its regulations. In this game scientists have to compete for scarce resources, whereas the cost of monitoring and reporting is very high both for the principal and for the agents. Lowering the costs of the monitoring process, and stabilizing the game could be achieved by moving towards the more customary peer-review system as a way of quality control. However, NRDIO has opted in favour of a monitoring process carried out by civil servants, a process which is both expensive and is perhaps in some cases insufficient in terms of the scientific content brought to bear on the quality assessment procedures. Strict monitoring by civil servants tends to result in complicated and rigid procedures and regulations, which in turn make flexible responses and reasonable adaptations to requests on the part of the scientific community next to impossible. The principal-agent game could also be stabilised by setting the objectives in a joint manner, involving scientists in such a way that the objectives are accepted both by the agent and the principal alike. In this context, attempts at stakeholder consultation and regular dialogue between civil servants and scientists have been made, but due to the rigidity of the system, any results coming out of

these negotiation processes are rarely implemented in policy documents. By far the largest number of the attempts at flexibility in joint priority-setting are scuppered by the existing institutional practices. It seems that the Hungarian RDI system is characterized by strong path dependency.

Scientific cooperation in the European arena can also be described as a principal-agent game, in which the European Commission is the principal, and members of the European scientific community are the agents. Similar to the Hungarian case in itself, the EU favours competition and strict compliance to rules, and it is also well known that tight bureaucratic control on the part of the Commission is very much a characteristic of the system. European science and technology policy often adds to the political and institutional complexity of science and technology policy-making without actually helping to increase the problem-solving capacity of the member states. Nevertheless, there is a clear European added value of collaborative projects and various types of partnerships initiated and supported by European framework programmes in order to tackle global challenges.

Even if science policy is not the sole competence of the EU, its policy decidedly has an impact on national science policies. It does so in various ways. First, in centrally planned, managed and funded European framework programmes, the EU, plays the role of a policy entrepreneur by setting the research agenda. This role of the EU as policy entrepreneur has been increasing in tandem with the growing

importance of international cooperation and the increasing amount of funds allocated to framework programmes.

Secondly, in countries such as Hungary the importance of financial resources deriving from the European Structural and Investment Funds (ESIF) is crucial. Even national programmes and national budgets are to a large extent used to balance or complement ESIF funded programmes. This impact on agenda setting of national programmes on the part of the European Union is further increased by the potential synergies between European framework programmes and Structural Funds, a synergy that is encouraged by the European Commission. This severely restricts the impact national agenda-setting can exert on the international RDI agenda.

In the case of Hungary, it is clear that Hungary on its own lacks the gravitas to successfully put an issue on the European research agenda if it is not backed up by other countries. These limitations put on the scope of international agenda-setting for national governments can to a certain extent be overcome by building coalitions and joint priority-setting. Good contacts with traditional partner countries in Western Europe, like Austria and Germany, are also expected to increase the likelihood for Hungary to open up windows of opportunity, to put themes on the research agenda, and to mobilise the necessary political goodwill and financial resources in order to facilitate the practical implementation of items on the research agenda.

The network of Hungarian science attachés abroad also plays an important role in supporting bilateral cooperation, establishing new contacts, representing the interest of Hungary and Hungarian scientists in partner countries. Nevertheless, results of my survey show that the potential of the network is not used in an optimal way: science attachés miss clear guidance and professional advice from their home departments in recent years.

3.2. Impact of international political events on scientific cooperation

The history of Hungarian science policy over the past centuries has provided sufficient evidence that significant international political events have a major impact not only on national but also on international science policy issues of the country. It is incumbent on the science policy makers living in these political state of affairs and changes to turn challenges into advantages.

After the tremendously negative impact of the treaty of Trianon in the 1920s, it was because of the resilience and the efforts of Kuno Klebelsberg and Zoltán Magyary that a network of Hungarian research centres and Hungarian faculties were established in the most important European capitals. The strong governmental support given to international scientific cooperation shifted the balance from what to all intents and purposes seemed a traumatic political event in favour of a positive approach to science policy. The institutions that were established in this period were managed by excellent scientists and

science diplomats, who enhanced both the reputation of Hungarian science and of Hungary in general.

After WWII the communist regime had a considerable impact on the scientific landscape in Hungary. By 1956, most of the scientific contacts with non-socialist countries were severed, international cooperation was almost completely limited to bilateral collaboration with the Soviet Union. This dire situation changed during the 1960s, a period of opening up in which international cooperation was encouraged, even with capitalist countries, and in which the first bilateral intergovernmental scientific cooperation agreements were signed.

Framework conditions for international scientific cooperation significantly altered after the systemic change. In the 1990s new bilateral agreements were signed, Hungary joined international research organisations. Hungarian scientists already participated in the 4th Framework Programme of the European Union in 1994, 10 years before Hungary's accession to the European Union.

After 2004, framework conditions for international scientific cooperation again took another turn. Hungary was promoted from the status of an underdeveloped and poor transition country into a Member State, i.e. an equal partner with equal status, rights and obligations as the other Member States.

Joining the EU also had a major impact on bilateral cooperation with other Member States. For international cooperation many European

countries give preference of employing existing European schemes, mainly framework programmes, over bilateral schemes. Although the European budget for RDI is still relatively modest in comparison to national budgets, its weight and importance in international scientific cooperation inside of Europe has proven to be significant.

3.3. Modalities of scientific cooperation

Intergovernmental S&T agreements and Memoranda of Understanding generally set the scene for bilateral cooperation. Such agreements provide a very general framework, details of implementation are fully dependent on the interests of the two partner signatories.

Hungary as a rule tends to join successful programmes initiated by its partners rather than proactively looking for new partners or novel ways of collaboration. This phenomenon very well reveals that even a strong, centralised institution, such as NRDIO, is not in the position to have a substantive impact on bilateral relations without a clear and well-thought out strategy. As long as international cooperation activities are backed up by ad-hoc measures instead of well-defined long-term clear priorities, it cannot be realistically expected that the participation of Hungary in European programmes will be increased.

Nevertheless, there are certain clear trends that characterize the developments of Hungarian international science policy in recent years: complicated and time-consuming intergovernmental agreements are replaced by inter-institutional forms of cooperation,

bilateral schemes are often substituted by multilateral, regional programmes, funding joint research projects are preferred over financing mobility schemes. As a next step, many of the nationally financed schemes of scientific cooperation aim at an increased participation in multilateral programmes. Furthermore, there is a trend for bilateral cooperation to be replaced by cooperation in European programmes.

However, bilateral scientific cooperation also has advantages of its own that justifies its existence even between European countries over and above larger multilateral European programmes. Single countries will have their own idiosyncratic priority areas, challenges and interests, other than those identified on the European level. It can be more efficient and less complicated to set common targets and to agree on joint priorities with only two countries at the negotiating table.

Although providing financial support for the mobility of researchers is often criticized by policy makers, it remains a modality of funding well-favoured by scientists themselves, who frequently apply for it. As the results of the survey, carried out with project partners and coordinators in Hungarian-Austrian mobility projects reveal, this type of projects is considered to be an effective and relatively inexpensive tool to improve existing bilateral contacts, to write joint publications, and to involve and motivate young scientists. The necessary national funds for travelling are as a rule not available to Hungarian institutions and scientists, so a considerable number of contacts would not have been established or sustained if funding for the mobility of researchers

on the basis of memoranda of understanding had not been available. The relatively heavy administrative burden and costs of such mobility schemes could be decreased by an overall simplification of the rules and regulations.

A possible way to extend bilateral mobility schemes is to turn them into regional schemes. The advantage of a regional call is that it brings together a number of research groups, who can jointly submit a proposal to European framework programmes as members of an already existing research consortium. Participation in regional calls also requires advanced skills to manage and harmonise procedures, which is an added benefit when it comes to successful applying for more complex funding schemes. Submitting research proposals to European programmes is therefore often a requirement of such regional calls for proposals.

Another way of international scientific cooperation is the joint funding of research projects, which is typically a form of cooperation with countries outside of Europe. Partners need special skills to write complicated research proposals, plan timelines of activities and budgets, which can be seen as a preparation for the participation in more complex programmes. Another advantage of such programmes is that thematic fields are defined by the partners based on their mutual interests and existing cooperation. This increases the likelihood of obtaining sound and excellent scientific results, which is beneficial for both countries involved. The main drawback is the high cost of

participating in such schemes both in terms of matching budgets and administrative burdens.

The thesis also describes three countries as examples of the three ways of bilateral cooperation. Austria and Hungary have continued to support the exchange of scientists by funding the costs of mobility of researchers. Germany has put European programmes in the place of dedicated bilateral schemes for cooperation. Turkey and Hungary have decided to switch from bilateral mobility financing to funding research projects.

A direct advantage of international cooperation is the access to funds provided by international programmes, such as the European framework programmes. International co-publications are not only encouraged by such programmes but they are the most immediate and measurable results of international collaboration. As excellence is one of the main evaluation criteria of these programmes, members of collaborative project consortia will have access to the most recent and excellent research results. Internationally well embedded, excellent scientists can also serve science for diplomacy purposes. Another indirect benefit of such cooperation might be the dissemination and transfer of acquired knowledge both in the scientific community and in the wider public. Technology transfer might also lead to profitable industrial applications.

The issue of profitability also raises the question as to what extent fundamental research with long-term benefits is to be distinguished

from innovation related activities with short-term and immediate results and how these two forms of science should be differentiated and supported. Curiosity-driven research needs maximum autonomy, so unlike applied research and technological development, it should not be influenced in a top-down manner. Applied research activities might be targeted by thematic calls in order to respond to social and economic needs. Basic research, applied research, technological development and innovation are not contradictory, conflicting concepts, their results should rather contribute to a dynamic knowledge circle.

Nevertheless, research cooperation also has certain additional costs: scientists have to spend their precious time on writing proposals, attending international meetings, do project reporting, instead of spending their time on conducting research. The increasing importance of international cooperation is also reflected in the growth of funds allocated to international collaborative projects. These larger amounts of available funds have resulted in stricter conditions and tighter control, in compulsory reporting, in more complicated evaluation requirements, in more bureaucratization. The tension between the need for better management and control on the one hand, and the academic culture of intellectual autonomy on the other hand has increased by the emergence of a new, international level cooperation and of subsequent management and control.

In certain cases international cooperation is a conditio sine qua non, but in some cases it is not per se obligatory. Science policy makers

and programme managers have to take into consideration both the costs and benefits when taking decisions about the appropriate magnitude and allocation of support for research cooperation. The modalities and key priority areas of cooperation should not be determined by civil servants managing funding programmes, or drafted by policy makers, but by real social needs for which scientific experts know in which direction to look for solutions to solve these societal issues. And for this to happen it is not always mandatory to work in large international projects, smaller-sized projects can also fit the bill in a better, and less expensive way.

Competition on a global scale for the benefits from international knowledge creation is starting to increase. National efforts are needed to develop favourable research conditions and capabilities in order to make the country an attractive choice for researchers seeking for cooperation. Global knowledge creation is mainly beneficial for the most developed countries, which can offer excellent research infrastructures, laboratories, and the most rewarding and the best publication opportunities for scientists.

For countries like Hungary with a smaller scientific community, limited budget and less developed research infrastructures the challenge to acquire the knowledge created at the global level and to apply it to specific local needs is of pivotal importance. Open calls for proposals offer equal opportunities for small and large countries because the selection of scientists is mainly based on the criterium of scientific excellence. The necessary preconditions for scientific

excellence would be skill development, life-long learning and a strong education system. Based on European Innovation Scoreboard data, Hungary currently performs well below the EU average in these fields, which diminishes the chances of the country to catch up.

Small countries, like Hungary, do not possess the means to become excellent in every scientific field, though. They have to set priorities based on their local needs, resources and national excellence in niche areas. Smart specialisation strategies are intended to serve this goal but the current Hungarian strategy is too general in scope, covering all scientific fields, open for any region in the country. The next national smart specialisation strategy should be more narrowly focused, built on local strengths, niche competences and human resources and support schemes should be planned along the same priorities.

If countries like Hungary will not succeed in obtaining a good position in the increasingly competitive playing field of science and science funding, the divide between less and more developed countries will only grow wider. In order to increase the competitiveness and hence the social wellbeing in the country Hungary should create a favourable environment for science. In addition to provide stable framework conditions inside the country, both bilateral and European level cooperation should be enhanced in order to ensure the efficient uptake of the results of technological development and innovation and of the knowledge that is created internationally.

4. Relevant publications

Ágota Dávid, Sami Niinimaki, Marie-Pascale Lizée, Marc Vanholsbeeck: ERAC SWG OSI Opinion on future Open Science and Open Innovation priorities in the European Research Area (2020-2030), European Research Area and Innovation Committee document, Brussels, March 2020

Jonas Abs, Kristof Bertram, Ágota Dávid, Armela Dino, Axel Leisenberg, Olivier Steffen: Benchmarking exercise on strategies and roadmaps for international cooperation in R&I, European Research Area and Innovation Committee/Strategic Forum for International S&T Cooperation document, Brussels, December 2019

Thomas Lichtenwöhrer, Karina Angelieva, Vladimir Manolov, Matti Hiltunen, Ágota Dávid, Pavoncello Grazia, Patrick Schelvis, Erik F. Øverland, Peter Eriksson, Mascha Zurbriggen: ERAC SWG OSI Opinion on Open Innovation, European Research Area and Innovation Committee document, Brussels, March 2019

Ágota Dávid, Tamás Szigetvári: The Potential Advantages and Synergies of an EU-Turkey Cooperation in Science, Technology and Innovation in Journal of Economic Cooperation and Development, vol. 38, no. 1 (2017), pp. 127-160

Ágota Dávid: The participation of Austria and Hungary in the Framework Programmes for Research and Technological Development of the European Union – A comparative analysis in Romanian Journal of European Affairs, vol. 16, no. 4, December 2016

Dávid Ágota, Szigetvári Tamás: Az Európai Unió és Törökország közötti tudományos együttműködés – Előnyök és lehetséges szinergiák in Külgazdaság, LIX. évfolyam, 2015