

Informal networks of innovation policy makers in the EU28: a study of structures and proximities

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This paper studies the structures and characteristics of informal networks between national innovation policy makers. Recent years have seen increasing interest in innovation networks, but until now there has been limited knowledge on how different proximities shape the informal networks between policy makers and its potential consequences. This study looks at the 28 EU innovation policy directors and the resulting 756 possible connections between them. I first use social network analysis to map the structures of the informal networks between policy makers. Then I use logistic regressions to test three types of proximities: geographical, policy-related and cultural. Distinguishing between asymmetric and symmetric ties, I find a centre-periphery pattern for the former and a three-fold cluster structure for the latter. Regarding proximities, I find that geographical and cultural proximity matter for both kinds of tie, but a similar level of innovation performance only predicts a symmetric tie. These findings provide a useful insight on possible cross-border learning, as we see policy-makers reaching beyond their 'natural' peers in search of new knowledge. As such, the proximities in informal networks have potential implications for learning and require continued attention from national and international organisations alike in order to facilitate knowledge flows between countries.

Creating an interaction space for science diplomacy: meta-governance principles in action

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Science Diplomacy has emerged as a popular theme in foreign policy and science policy discourses. With its roots as a soft power mechanism, an arguable second wave of science diplomacy coincides with the observation that grand societal challenges have become increasingly complex, requiring specialised knowledge and technologies, and that these challenges are less and less likely to be tackled by traditional policies or tools. So, it makes sense to consider whether and how science diplomacy, a boundary concept describing the interconnection between the world of science and the world of diplomacy, can be positioned, both conceptually and operationally, to improve the collaboration between international actors to address the challenges they face.

In this paper, we will posit that addressing global challenges requires systemic changes involving a transformed science-diplomacy interface, resulting in new policies informed by science, new modes of science informed by diplomacy, and new modes of diplomacy informed by science. We ask: How can interactions at the science-diplomacy interface intended to address societal challenges be organised for them to be constructive and productive? With this research question in mind, we present a meta-governance framework developed specifically to guide stakeholders in the organization of productive and constructive “science diplomacy interaction spaces” (see below).

We approach this question from the perspective of meta-governance as introduced by Jessop c.s. Meta-governance is a notion from policy studies describing the observation that traditional governance modes – e.g. hierarchy, network, market – are incapable of solving societal challenges, if they are not mixed and continuously re-balanced and evaluated. As a result, governance frameworks constructed with meta-governance in mind cannot prescribe specific actors or mechanisms that constitute the ‘perfect’ science diplomacy. Rather, a meta-governance framework presents the enabling conditions that need to be met for stakeholders to be able to work substantively on developing science diplomacy activities.

This does not preclude the meta-governance framework to be ‘prescriptive’, however. It is a normative framework developed with the political goal of addressing transboundary societal challenges in mind. Hence, this meta-governance framework presents science diplomacy as a governance mode in itself that will enable stakeholders to continuously recalibrate the governance of specific policy issues and tensions occurring at the intersection of foreign policy and science. The governance framework will also not be able to bridge all tensions conceivable between actors in the international context. Value systems, interests, and worldviews may simply be too divergent to come together and commit to common interests. Thus, the governance framework presupposes the transcendence of national interest towards what has been called a cosmopolitan worldview (Ulrich Beck). Our Protocol is only usable in situations that are potentially collaborative and not competitive.

The meta-governance framework – “A new Science Diplomacy Protocol” – consists of nine procedural and three infrastructural principles meant to guide smooth transboundary knowledge flow by means of illustrating ways to cope with potential tensions occurring at different stages, levels of decision making and arenas of practice in the science diplomacy enterprise evolving in the international politico-scientific context. The nine procedural principles are: sensitivity, inclusiveness, transparency, deliberation, reciprocity, complementarity & manoeuvrability, legitimacy, alignment and evaluation. The three infrastructural principles are: capacities, capabilities and trust. All principles were derived from lessons learned from the empirical programme of the S4D4C project¹, and from the authors’ knowledge and expertise on science policy and governance studies. The empirical basis includes 9 case studies and a transversal case analysis. The principles are defined and described in greater detail including examples from the other products of S4D4C, notably the empirical case studies and the transversal case analysis.

As such, the new Science Diplomacy Protocol is geared towards creating what we term the Science Diplomacy Interaction Space at the intersection of the scientific knowledge production arena, the problem deliberation & reflection arena, and the politics & powering arena. These arenas represent specific practices that altogether shape those activities that can be labelled as science diplomacy. We deliberately refrain from a specific actor perspective, as the notion of social practices allows for a more nuanced picture. To mention just one example, universities, of course known primarily to figure in the scientific knowledge production arena, also engage in agenda-setting, which would also fit the problem deliberation & reflection arena.

We conclude that meta-governance thinking is particularly fit to interact with the substantive elusiveness of science diplomacy as a concept. The procedural and infrastructural principles are shaped so that science diplomacy activities do not only figure traditional diplomatic stakeholders and mechanisms. Rather, they represent the move towards international governance beyond national governments and including lower policy levels, NGOs, business and other civil society organizations. These actors are invited to put the framework to the test when organizing science diplomacy activities geared towards addressing and ultimately tackling societal challenges.

¹ “Using science for/in diplomacy for addressing global challenges (S4D4C)” was a three-year H2020 project dealing with the phenomenon of science diplomacy. Among others, it brought together scholars from higher education studies, science studies, policy studies and foreign policy. It was a profoundly transdisciplinary project with national science and technology foundations from Spain, Germany and Austria involved.

LEGAL PLURALISM IN SCIENCE DIPLOMACY - The case of Colombia 2012-2016

This study aims to answer the question: How the Colombian legal framework accommodates science diplomacy in Colombia (2012-2016). To address this question, it set out with the general objective to examine the pluralistic approach of the Colombian legal system to incorporate international dynamics, such as “Science Diplomacy.”

This dissertation is framed within the period between 2012 and 2016, which marks the evolution of Colombia from a country undergoing civil war to one that found legal instruments to negotiate its internal conflict with a guerrilla of nearly 15,700 guerrillas strewn throughout most of the Colombian territory (RCN, 2015).

This study pursues the following specific objectives:

1. Prove or deny the coexistence of two or more legal systems that have accommodated science diplomacy in Colombia from 2012 to 2016.
2. Analyze how Free Trade Agreements signed by Colombia have influenced legal systems to accommodate science diplomacy.
4. Present conclusions and propose further research on key topics identified; especially, on understanding the capacity or incapacity of legal structures to respond to global dynamics.

The proposal is that because of its complexities, uncertainties, and ambiguities, science diplomacy in Colombia should be accommodated using a legal pluralism approach, which would imply acknowledging a diversity of legal tools available to scientists and policymakers to collaborate with international actors, as a limited and single legal view may restrict the development potential of global scientific collaborations.

Based on a review of more than twenty empirical cases identified in the academic literature, and especially those presented in the section above, it is possible to classify three ways in which national legislations have accommodated science diplomacy:

1. International formal treaties,
2. Less formal or simplified international treaties, and
3. Non-formal international agreements.

Each of these legal mechanisms has strengths and weaknesses that will be studied further. The following section of this chapter will define the legal mechanism used for accommodating science diplomacy. For each one, several empirical examples will provide evidence on its application at the national level. The same three categories could be seen in the case of Colombia during the timeframe of this research.

To assess the legal pluralist approach the Coexistence of Legal Systems in the same jurisdiction was not the only variable used. In addition to that basic one, three other variables were added: Social control over the coercion of law (Teubner, 2009), Active citizen participation in the process and Dialectic Interactions (Berner, 2012).

The study is based on the premise that, in Colombia, public interactions with other states should follow the Colombian constitution's provisions. However, it recognizes the limitations of solely using this legal course when undertaking scientific collaboration under science diplomacy. Therefore, it examines other legal structures, such as international complaints to respond to globalization's international dynamics. Thus, the research uses the theoretical framework of legal pluralism to analyze the coexistence of different legal structures and instruments needed to respond to the dynamics of science diplomacy.

The research was undertaken using the case study methodology by Yin (2009) and four cases were selected:

1. Zika control disease in which the US Center for Disease Control - CDC partnered with the Colombian Instituto Nacional de Salud - INS for undertaking scientific research to control the virus.
2. Santurbán moorland in which US NGO Aida and Canadian NGO Mining Watch partnered with Comité de Defensa del Páramo de Santurbán for using scientific evidence to protect the ecosystem before the World Bank Ombudsman Compliance System.
3. Budapest Treaty on Deposit of Microorganism Patents in which the Colombian government partnered with the World Intellectual Property Organization - WIPO for sharing international legislation under which the deposit of a microorganism could be valid in any country for patenting purposes.
4. New Plants variety in which the Colombian government partnered with the French UPOV for granting special treatment on intellectual property rights to scientifically developed crops.

Data for this research was gathered from archives, documents records, but especially by interviews to key actors that were part of the science diplomacy dynamics that happen in each of the selected cases. More than 20 interviews were made and contrasted with secondary sources, which allowed the researcher to reach to some conclusions.

The results of this study provide insights into the pluralistic mechanisms used in Colombia for accommodating science diplomacy, which are the same used when assessing different science diplomacy experiences worldwide: international formal treaties, less formal or simplified international treaties, and non-formal international agreements. In fact, the study shows that the Budapest treaty and the New plants variety used the formal treaty structure but not necessarily coexist in a positive way with the other empirical examples. In fact, Zika used a less formal law and Santurbán an informal law. Yet, according to the other variables analyzed, Santurbán was the most pluralistic example because the dynamics between the different scientific actors involved responded to dialectic interactions that went beyond the formal participation. Zika was less pluralistic because it lacked strong participation of key scientists from Colombia that could have played a fundamental role in the science diplomacy dynamics.

In the case of Colombia one conclusion is that science diplomacy is affected by free trade agreements. That was the case of two of the empirical examples used in this research: New Plants Variety and Deposit of Microorganism. That conclusion can also happen in other countries, therefore it is important to continue studying the links between free trade agreements and science diplomacy, especially in developing countries such as Colombia.

Understanding the goals, tensions, expectations, and lessons learned from the case-study will undoubtedly give insights to the scientists' and policymakers' ability to work jointly to build a multidisciplinary team to address global challenges.

The thesis concludes by presenting a framework and by suggesting to move from “legal” to “normative” pluralism since Science Diplomacy is a process that involves different communities that need social rules to be resilient vis-à-vis global trends. This will be particularly relevant in a country like Colombia where, by 2019, the Ministry of Foreign Affairs had not incorporated science diplomacy in its agenda (Cancillería, 2019) impacting the pluralistic approach under which science diplomacy actors have accommodated international science diplomacy dynamics.

A cross-country configurational approach to academic international mobility: exploring mobility effects on academics' career progression in EU countries.

Previous research on international academics' mobility has emphasised the potential gains and losses for national productive systems, derived from academics' international mobility (Edler et al., 2011; Baruffaldi and Landoni, 2012; Cañibano and Woolley, 2015). During the last decade, the positive stance towards mobility has taken thrust because of the systemic and individual benefits derived from human capital circulation (Fernández-Zubieta et al., 2016). Overall, international mobility is considered beneficial for both home and host countries: it favours knowledge production and diffusion and fosters the collaboration between countries (Baruffaldi and Landoni, 2012).

European mobility policies have promoted mobility on quantitative bases, linking higher mobility to a more integrative European research system (Cañibano et al., 2008). The expected benefits derived from international mobility play a determinant role in the final academics' decision to move abroad. For this reason, a recent stream of literature on international mobility has focused on analysing the influence of academic mobility on diverse career outputs or dimensions (see Netz et al., 2020 for a review). The aim of this study is to better understand the relationship between international mobility and academics' perception of its impact on their academic career progression. Our research questions are the following: RQ1: How international mobility and academic career progression are connected in EU countries? RQ2: What configuration of mobility options (short-term mobility, long-term mobility and migration) and context conditions (academics' perception about science system rewards linked to mobility) leads to academic's career progression? These are relevant issues for the literature on international academics' mobility as well as for public policy design for national science systems in the EU.

This paper is based on the scientific and technical human capital (STHC) approach (Bozeman and Corley, 2004; Jonkers and Tijssen, 2008; Netz et al., 2020). Bozeman et al. (2001, p. 636) defines STHC as the "sum of an individual researcher's professional network ties, technical knowledge and skills, and resources broadly defined." According to this approach, scientific collaborations are an important input for academic learning and training. International mobility represents an effective individual strategy to promote these collaborations (Edler et al., 2011).

We use the indicator tool of the Mobility Survey of the Higher Education Sector (MORE), 2016 wave (<https://www.more3.eu/indicator-tool>) to do a cross-country comparison of the effects of international mobility on researchers' global career outcomes. MORE is considered as the most comprehensive empirical study on researchers' mobility. The indicator tool contains around 150 indicators which represent country aggregated data from the European Union Higher Education (EU HE) Survey about researchers, their careers and mobility. This survey was administered in 2016 to representative samples of researchers in each of the 28 European Union (EU) member

states. However, due to missing data, we were able to include in the analysis only 24 of the currently EU member countries.

Using EU's MORE3 database, we implement a fuzzy-set approach to qualitative comparative analysis (FsQCA) to explore mobility patterns, science system level characteristics and perceived impact of international mobility on academic career progression. According to our results, countries where academics perceive that international mobility has a positive impact on their career progression correspond to three configurations:

- (1) Configuration 1: Germany, Belgium, Austria, Finland. Most of academics go both for short-term stays and migration. Academics benefit from international collaboration and networking and they perceive that their national science systems use international mobility as a criterion for career progression.
- (2) Configuration 2: France, Netherlands, Cyprus and Luxembourg. Most of academics do long-term stays or migrate for a period. Doing short-term stays is a scarce practice. Advantage for career progression does not come directly from mobility recognition schemes in the national science system, but from the benefits of the international mobility in terms of academic collaboration and networking.
- (3) Configuration 3: Poland. Very few academics do any of the three forms of international mobility, but they perceive institutional system does recognise international mobility for career progression. This is sufficient for a large part of academics to perceive that international mobility has a global positive effect on their career.

For the remaining countries (Italy, Spain, Portugal, Greece, Hungary, Czech Republic, Slovakia, Bulgaria, Croatia, Slovenia), international mobility does not generate positive effects on academics' career progression. International mobility might be perceived as an activity that softens the academics' ties with their home university / research institute (Jonkers and Cruz-Castro, 2013). Finally, for Estonia and Lithuania any form of international mobility seems to be an infrequent practice among academics and the effect on career progression is null or negative.

This paper makes four contributions in extending our understanding of the links between international mobility and academics' career progression. First, it addresses recent calls for comparative studies across countries (Netz et al., 2020). Most of previous research on the effect of international mobility on academics' output has restricted the context of study to a single country such as Norway (Asknes et al., 2013) or Spain (Cañibano et al., 2008), while some other studies have focused on a few countries (e.g., Baruffaldi and Landoni, 2012). Through a cross-country configurational analysis on 24 EU countries, this study sheds new light on the STHC approach.

Second, rather than considering a single type of outcome, in this paper we focus on the effect that international mobility has on the overall academics' career progression. Career progression is a key indicator for evaluating whether academics have actual incentives to move abroad as European institutions are trying to promote. Moreover, it provides a more comprehensive assessment of the consequences that international mobility has on academics' career; thus, adding substantially to previous fragmented

and partial impact measures addressed in most studies (see Netz et al., 2020 for a review). Indeed, international mobility could have positive effects in all the facets of the academic activity, not only research (i.e., also teaching, knowledge transfer activities and knowledge about how to organize and manage research groups and networks) and happen in all knowledge fields / disciplines (Cañibano et al., 2011), which is hardly captured through specific research outcomes such as article publications, patents or collaborations with international colleagues.

Third, rather than analysing highly productive scientists or elite researchers (Cañibano et al., 2008; Jonkers and Tijssen, 2008; Halevi et al., 2016), who are far from being representative of the average researcher, we provide a more insightful understanding on the academic community by focusing on what Gibson and McKinzey (2014) called the “ordinary scientist”, considering a representative sample of scientists working at higher education institutions at country level and their aggregated perceptions.

Finally, we respond to recent calls asking to analyse not only whether but also how international mobility may influence academics’ career (Netz et al., 2020). Conducting a country-level comparative qualitative analysis is a complementary and novel approach to explore the relationship between international mobility and academic career progression which allows us to evaluate the extent to which the national science systems and the actual academics’ mobility patterns create a favourable setting for mobility. Thanks to this analysis, we have established different countries’ configurations which represent an important input for science policy design in EU.

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