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1

Seeing Technology Assessment with New Eyes

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Abstract: *Van Est et al. present a 'relational' model for analysing technology assessment (TA) institutions. Expanding on metaphor of TA as a bridge between science, society and policy, the authors describe how such bridges are established in terms of network relations. European TA institutions in various ways link parliaments and governments with civil society and science. In part, TA projects provide such linkages, but importantly, TA institutions in themselves also provide informal personal links between societal spheres. With in-depth examples from different European member states, Van Est et al. provide institutional entrepreneurs with rich material for imagining institutional TA arrangements that might fit within their own national arenas.*

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Creating institutional platforms for technology assessment (TA) has proved possible via different nationally specific pathways. In examining these pathways, previous reflections on the institutionalization of TA have focused on the relationships between TA institutions and national parliaments. However, movements both internal and external to TA mean that relations to other societal spheres have gained increasing importance for many TA institutions. In order to provide insight into the full range of possible institutional arrangements for delivering policy-oriented TA services, we provide a model for the network relations that help to create and sustain TA institutions. We then draw out implications for the design of S&T governance.

A relational framework allows for a better understanding of technology assessment and its role within the complex of institutional relations underpinning the governance of science and technology (S&T) in society. Understanding TA in relational terms implies taking full account of the position that TA occupies in a social network (e.g. a governance network) and acknowledging that various bonds enable and constrain the activities of organizations performing 'TA-like' functions. We apply this model to existing TA institutions and develop a typology of ways that TA may evidently fit within national institutional contexts. Our motivation is to help institutional entrepreneurs and political supporters of emerging TA platforms to imagine arrangements that will fit their specific national arenas. We seek to provide evidence of the relations between TA, other public institutions, and other societal sectors in order to guide strategic processes of network-building around the promotion of national TA capacities. Moreover, we argue that TA can and should be seen as a necessary part of democratic S&T governance.

The model expands upon a long-standing metaphor for TA as a provider of 'bridges between science, society and policy' (Decker and Ladikas, 2004). The model concretely maps the relationships between existing parliamentary technology assessment (PTA) institutions and four societal 'spheres' involved in S&T governance, namely parliaments, governments, S&T, and (civil) society. The mapping takes into account a range of mechanisms of interaction between these spheres, distributed on a macro (institutional), meso (organizational) and micro (project) levels. The model thereby illustrates how (P)TA functions in terms of information exchange and relational trust-building between different societal actors.

Comparing the results of our case studies, it is clear that 'parliamentary TA' is much broader than the label suggests. While parliament

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remains an essential base for most existing policy-oriented TA organizations, building and maintaining credibility towards actors within government, S&T, and society in the broad sense is important for operating effectively and with legitimacy – even for TA offices nested inside parliaments. Five different organizational variants of TA are currently operational where different weight is given to each of these societal spheres. There are thus many strategies to pursue in countries that want to establish TA-like support functions, and the material provided here will help to make the best of the opportunity structures that exist in each individual country.

Lessons learned, relevant to promoters of TA-like arrangements, include:

- Acknowledge the dependence of TA in order to achieve independent advice with an impact
- Consider the whole institutional possibility space when setting up new TA organizations
- Foster relationships on the institutional, organizational, and project levels

Background

Throughout its history, three concerns have been of fundamental importance to the practice of PTA, namely:

- how to institutionalize PTA
- how to structure PTA organizations
- how to design and perform PTA projects

For example, the establishment of the Office of Technology Assessment (OTA) in 1972 in the United States presented a real institutional innovation. OTA was meant to provide Congress with 'unbiased' information concerning, for example, the social and political effects of technologies. The establishment of a congressional TA bureau was a way to redress the imbalance between legislature and executive with regard to technological change, and thus it was an attempt to strengthen the representative model of democracy (Van Est and Brom, 2012). When during the 1980s several European countries created PTA institutions, the focus was also quite naturally on institutionalizing and organizing PTA. A key issue in

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this debate was how the relationship between the Parliament and the TA organization should be shaped to make it fit comfortably in the specific political cultures of each country.

In some countries, such as Denmark and the Netherlands, controversies over technologies were seen not only as a matter of power balance between the government and each parliament but also as a problem between the government, the parliament, and the wider public (Van Eijndhoven, 1997). As a result, in these countries public education and debate were seen as central to the mission of PTA, which led to early experiments in 'participatory' TA. In the 1990s, growing uncertainty and societal disagreements concerning pathways for technological innovation and economic development led to increased political interest in the use of participatory methods to achieve legitimacy of hard political choices that were made in situations where science could provide only soft evidence, and these choices would need legitimacy through public deliberation and consent (Funtowicz and Ravetz, 1992). During this period, debates in the PTA community (facilitated for instance by the EUROPTA project) sought to consolidate practical experiences with public engagement and to arrive at mutual understandings of how to design and perform participatory TA projects (Joss and Belluci, 2002) – for instance, the role of project management, the choice of methods (Van Eijndhoven and Van Est, 2002), and the impact of participatory TA (Hennen, 2002).

At the turn of the millennium, however, the initial wave of 'participation optimism' at the political level was countered by demands for evaluative evidence of the positive effects of linking citizens' participation and stakeholder dialogues to processes of policy formation based on expert input. To maintain its political legitimacy and mandate, the PTA community thus became concerned with the visibility and impact of its own activities. In the TAMI project (Decker and Ladikas, 2004), this led to a wider reflection on the types of impacts that TA processes could have on different clients in different situations and how the institutional context of a PTA organization served to both enable and constrain the impact that TA could have on various publics (Cruz Castro and Sanz-Menéndez, 2005). Reflections on the practicalities of achieving impact in a world of distributed network communication led the TA community to focus on multiplatform communication (policy briefs, personal networking, websites, blogs, and media appearances).

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The compounded output of these debates can all be traced in the so-called process definition of TA, which became standard after the TAMI project:

> Technology assessment is a scientific, interactive and communicative process which aims to contribute to the formation of public and political opinion on societal aspects of science and technology. (Bütschi et al., 2004: 14)

Today, we see a need to articulate the relevance of approaches to policy support developed within TA in a new and broader context of grand societal challenges. Here there may be a need for 'non-PTA' actors to take up and carry on the same practices. To this end, the openness of the definition of TA inherited from the TAMI project allows us today to apply the definition to a much broader field of organizations that work to provide similar forms of support to decision makers involved in S&T governance. The framework presented here can be used to clarify the institutional roles that various forms of TA or TA-like organizations can play within the governance of S&T.

The framework: TA understood in informational and relational terms

TA can be described in both informational and relational terms. On the one hand, the informational view characterizes TA practices based on the particular knowledge that they generate, namely knowledge about the societal aspects of S&T. The relational approach, on the other hand, starts with the insight that the TA field owes its continuing existence and position to support from its clientele. Our framework combines the two approaches based on the understanding that the informational and relational aspects go hand in hand. In support of this framework and adding to existing knowledge on TA, we try in the following first of all to come to grips with the relational aspects of TA.

Modelling TA in relational terms

Understanding TA in relational terms implies taking full account of the position that TA occupies in a social network (e.g. a governance network at regional, national, or European level) and acknowledging that various bonds enable and constrain the activities of organizations performing 'TA-like' functions. To create an evidence base for analysing

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these relational factors, we scrutinized the interaction between existing PTA organizations and various social actors (Van Est and Ganzevles, 2012, Ganzevles et al., 2014, PACITA, 2014). The following four societal 'spheres' were defined to group actors in the institutional landscape around PTA organizations: parliament, government, civil society, and S&T. The choice of these four spheres was dictated by the most common characteristics of European PTA. For PTA organizations, their institutional linkage with parliament is of primary importance. Government, however, may also play a crucial role – for example, as a sponsor but also a recipient of advice. In addition, relationships with civil society (in the case of public participatory TA) may play an important role in the practice of PTA. And since PTA is ultimately about governing S&T, the model could not have done without the inclusion of S&T as a societal sphere. Of course, these choices do not imply in any way that other spheres such as media, industry and business are not relevant in many ways to TA in general.

To map existing models in terms of their relations with the four selected societal spheres, PTA organizations were asked to express the involvement of each of the four social in percentages. The results show that PTA organizations indeed establish and maintain multiple relationships with the four discerned social spheres. PTA organizations differ from each other to the extent that they interact (on the institutional, organizational, and project levels) with the four distinct social spheres. Out of the fifteen theoretically conceivable interaction models, the mapping process in the PACITA project identified five distinct PTA models that are currently operational in Europe.

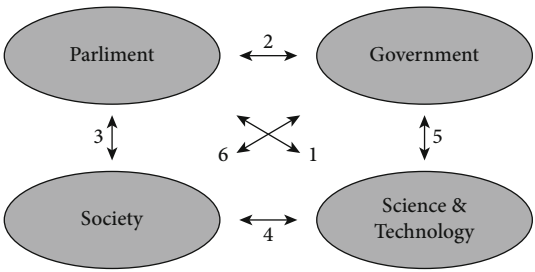

FIGURE 1.1 *Four spheres involved in the relation model of PTA*

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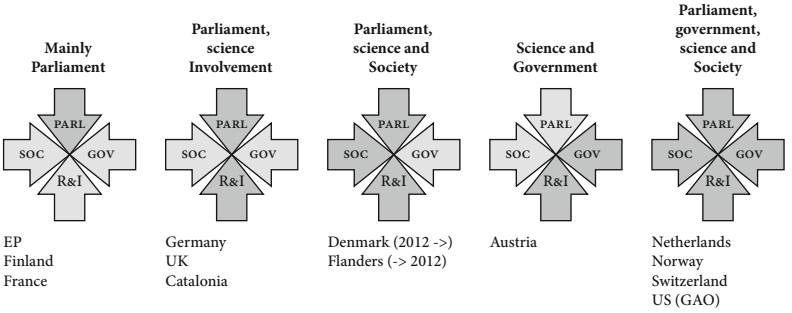

FIGURE 1.2 *Currently operational models of (P)TA*

We studied the linkages between TA and the four distinguished social spheres on three (interconnected) levels: institutional, organizational, and project. The macro-level or institutional-level concerns the political support for a TA organization that has the parliament as one of its main (formal) clients. It also concerns the way in which TA is legitimized and framed as an institutional solution for the governance of, often societally controversial, developments in research and innovation. The meso-level, or organizational level, concerns the politics of shaping and controlling the TA organization that has the task to perform PTA. Finally, the micro-level, or project level, relates to doing TA. Issues at this level are as follows: choices about the framing of the topic, choices between kinds of method, and strategies for establishing communication between the project and parliament or other recipients.. Our modelling of TA in relational terms is founded on the notion of informational interaction mechanisms, loosely defined as communicative procedures or routines on the institutional, organizational, and project levels for enabling and constraining the involvement of actors from the above-mentioned four social spheres in shaping the practice of TA. We discern nine interaction mechanisms: client, funding, evaluation committee, board, working program, project staff, project team, project participatory methods, and project revising and/or reviewing. While the first five interaction mechanisms play out on the institutional and/or organizational levels, the latter four all play out on the project level.

In the following pages, this framework is applied to three different cases, illustrating how the relational conceptualizing of TA(-like) activities may help to analyse the process of institutional pathfinding and adjustment, as well as institutional issues that underlie concrete TA projects.

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Case 1: pathfinding in Bulgaria

The relational model of TA can also be used to make emerging developments explicit, pointing to still-fragile structures, providing a snapshot of where a country is on a potential evolutionary pathway for TA. We use the case of Bulgaria to illustrate this.[1]

The TA-landscape

Bulgaria is in a highly explorative phase when it comes to dealing with the societal issues of S&T. The PACITA-partner, ARC-FUND, is a central player in this field. Its task is to 'shape policies and developments towards information society and knowledge economy in a national, regional, European and global context'. The national Academy of Sciences is another important actor. In Bulgaria, expert advice (like TA) to policy makers is a delicate matter. Besides a high level of public distrust in the political system, recent years also show an erosion of trust in scientific institutions. This creates a vicious circle in which policymakers rarely ask for expert advice and policy making is perceived as lacking a sufficient knowledge base.

In 2012 a temporary parliamentary committee on shale gas was set up to carry out activities, which – from a TA point of view – resemble a PTA project. The committee had some months to study and discuss good practices and legislative options for the environmentally safe exploration and mining of shale gas. Three hearings with external experts were held. MPs in the committee mainly listened; some complained; and others seemed to feel offended by the views of the experts. Both actors from the realm of S&T and representatives of NGOs were invited. These activities could have been a good starting point for setting up more of these PTA-like activities since a good example tends to be followed. The committee, however, has been subject to strong criticism: its objectivity and impartiality were doubted. It seems that objective, multidisciplinary analysis, interpretation, integration, and review of the knowledge gathered in the hearings were lacking. Developing TA-like skills and capacity might help make such TA-like activities trustworthy from both a political and a societal point of view.

A government – society – S&T network forum

The PACITA project enabled ARC-FUND to search for organizational and institutional TA-capacity. For several reasons, ARC-FUND considers

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the governmental branch a more favourable client and sponsor of TA than it considers parliament: to a large extent, the government branch governs the political decision-making process; preoccupied by the next election, politicians have little interest in 'long-term', complex S&T issues; the government has adopted a new national innovation strategy, to which the early 'horizon scanning' of societal issues, related to S&T developments, can contribute.

ARC-FUND's institutional strategy is to act as a network secretariat ('staff' in our modelling) for TA-like activities in Bulgaria. The formation of a cross-disciplinary TA network is aimed for, in which representatives of expert-based organizations, think tanks, and policy institutions are represented (board, committee, panel, or platform in our TA model). ARC-FUND aims to increase both awareness about TA as well as the level of societal debate (relevant for the 'client' category in our modelling). A TA network forum is foreseen, gathering annually for a public debate on the most pressing S&T related issues (cf. 'working program' in our model). There is no guarantee that this will lead to a formal institutionalization of TA. But various actors have addressed the need for a pilot project in order to 'prove' the relevance of TA for Bulgaria – preferably within the relevant organizational and institutional structures.

Case 2: Institutional re-adjustment in Austria

The relational modelling of PTA institutions enables us to map dynamic developments of existing organizations as relations change over time. Political dynamics may result in the shifting importance of the four societal spheres, to which the organization relates itself. One current case of such 'drifts in the possibility space' is Austria. Since the ITA is deeply rooted in the academic world and has a high proportion of studies carried out for government, the Austrian situation can be described as 'shared science-government involvement in TA'. Lately, however, we observe a slow move towards 'shared parliament-government-science-society involvement in TA' in that both the national and European parliaments are becoming more important as clients for the ITA just as the citizens become active participants in projects and target groups for increasing public-relations activities.

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Strengthening connections with society and parliament

First, Austria's core TA organization, the Institute of Technology Assessment (ITA), has expanded its portfolio considerably towards greater involvement of society. One the one hand, participatory procedures are gaining importance in the ITA's work programme and are at the centre of many ITA projects. While a few years ago the ITA mainly observed the developing participatory TA approaches, contributed to theoretical projects such as EUROpTA, or assessed participatory events carried out by others, the ITA is now involving citizens and stakeholders on a regular basis. On the other hand, its mother institution, the Austrian Academy of Sciences – as well as the Federal Ministry of Science, Research and Economy – push the ITA towards an intensified relationship with society. As a consequence, a professional public-relations unit has been set up inside the institute, not only feeding the new Internet-based social media but also playing an growing role in the ITA's public events and project dissemination activities.

Second, while there has been only limited contact between the ITA and the Austrian Parliament ('Nationalrat') for almost two decades, the situation has been changing since 2012. The Nationalrat has shown increased interest in TA. In particular, its Research, Technology and Innovation (RTI) Committee has invited the ITA on several occasions to present TA work and to explain what it could contribute to parliamentary work. The acknowledgement of technology assessment as a potentially valuable contribution culminated in 2013 with a full membership of EPTA. Since then, the ITA is in regular exchange with parliamentarians, offering amongst other things a newly devised policy-briefs series explicitly targeted towards MPs. These so-called ITA-Dossiers are two-pagers that present TA topics in plain language and with a focus on possible political action. Most recently, in mid 2014, the Nationalrat decided to solicit a study on how to best implement advice and input with regard to TA and foresight for the Austrian Parliament. This one-year study will produce concrete proposals for the future relationship between the Nationalrat and, in particular, the ITA. A pilot project on 'Industry 4.0' is also under way in 2015, with a view to include these experiences in the recommendations. For these projects, the ITA is partnering with an institute that specializes in foresight and technology policy, so the Austrian Parliament can be said to be knitting closer ties with the TA and foresight communities. Two further developments support this growing

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importance of the parliamentary level: first, the mother institution of the ITA, namely the Austrian Academy of Sciences, has started offering its competencies to the Nationalrat; presentations and debates of recent societally relevant research done in the Academy are planned as regular events in the premises of the Parliament. Second, the ITA became a member of the European TA Group (ETAG), carrying out projects for the Science and Technology Options Assessment (STOA) panel of the European Parliament. So far, four such projects were concluded.

Case 3: Placing a TA project in a cross-national context

The relational model can usefully be applied to concrete TA projects. The PACITA sub-project 'Future Panel on Public Health Genomics' had a transnational approach and involved a consortium of organizations from both PTA and non-PTA countries. It made use of the Future Panel method, in which, from the very start, a panel of MPs (the Future Panel) co-determines the research agenda, together with a broad range of experts and guided by TA specialists. In the PACITA experiment, the Future Panel method was used in a cross-European context. In this sense, the project was truly a methodological experiment (see Chapter 6).

Analysing this project at the micro (project) level, the meso (organizational) level, and the macro (institutional) level enables us to highlight some essential connections between these three levels and formulate some lessons for the future use of TA methods in a cross-national context. We learn that there is *therefore* a need for more knowledge about how the relational basis is established for TA in networks of organizations and on the transnational level.

At the project level, an important aim of the sub-project was to support evidence-based policy making on Public Health Genomics (PHG). However, it turned out to be difficult to connect the evidence base provided on a range of issues related to PHG to the European political and policy debate in a constructive way. The Future Panel consisted of MPs from different national parliaments, who had to discuss policy issues and options concerning PHG on a *European* level. Accordingly, the research and policy agenda that evolved in the PACITA project did not always match the political issues and the context, which members of the Future Panel, and members of the task team had to face on the national level. This gap between the national and European political agenda also

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limited the opportunities for dissemination of the project results, at both the European level and the national level.

At the organizational level, the close cooperation between established (P)TA institutions and organizations in countries without such institutions presented some practical challenges. These challenges, however, were taken into account to stimulate mutual learning and are discussed in Chapter 6. The cross-national dimension of these challenges, however, needs special attention. Within the PACITA project, the relational TA perspective was applied to clarify the interactions between *one* particular organization and the various identified social spheres: parliament, government, society, and S&T. But the team responsible for the Future Panel on PHG was not drawn from one organization with a clear position in the 'possibility space' of TA at the European level. In fact, the team was deliberately composed of members who represent organizations with *different* positions in that possibility space. There is a clear lack of knowledge about how TA projects are set up in cross-national networks of organizations.

At the institutional level, the institutional conditions for effectively connecting the project results to policy making were not in place. Future Panel members were invited as individual MPs, with no formal appointment by their respective parliaments. As a result, the connection between the project results and the respective parliaments was not very robust. And although funding was in place, it was not clear who the client actually was. We think that this is also true for many other FP7-funded projects. Many European Commission–instigated experiments revolve around the possibility of cross-European TA-like activities (Barland et al., 2012). One might argue that the EC is the client since it funds the projects and since EC-funded projects typically involve reporting in the form of sending deliverables with the project results to the EC. Our way of looking at TA presents a more involved type of client, either on the project, organizational, or institutional level. This raises the question of whether the proper institutional conditions are in place to truly connect the outcomes of EC-funded cross-European TA-like activities to policy making.

Lessons learned: Implications for the democratic governance of S&T

Defining TA in relational terms opens up a new way of understanding TA and leads to a new way of questioning TA and both its role and impact

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in the way that modern society deals with S&T. This section explores what implications our new approach has for the future of TA and, more generally, for the democratic governance of S&T. We believe that this set of lessons is relevant not only to the TA community but also to all kinds of TA-like activities, one important instance being the responsible research and innovation (RRI) activities that will be developed in the context of Horizon 2020.

The lessons learned are structured by the three key elements of our model: (1) connecting to four societal spheres; (2) making connections on the micro-, meso-, and macro-levels; and (3) making connection by means of interaction mechanisms. Our reflections have led to nine lessons.

TABLE 1.1 *Key elements of the relational model of TA and related research issues and lessons learned*

Key elements of the relational model of TA and related research issues	**Lessons learned**
Connecting to four social spheres	
• **Characterizing TA**	Lesson 1: Understanding TA in informational and relational terms is useful
	Lesson 2: TA can effectively play out in many institutional and organizational forms
• **Bridging PTA- and non-PTA-countries, and PTA and TA countries**	Lesson 3: Intellectual playing field needed between PTA, non-PTA and TA
	Lesson 4: When setting up new TA organizations consider the whole institutional possibility space
• **TA and the governance of S&T**	Lesson 5: Acknowledge the institutional and organizational constraints that the governance of S&T may face
• **Long-term institutional dynamics and adaptability**	Lesson 6: Existing TA organizations need to adapt to changing demands
Making connections on the micro-, meso- and macro-levels	
• **Making connections on three levels**	Lesson 7: Foster relationships on the institutional, organizational, and project levels
• **Organizational and institutional conditions for successful TA project**	Lesson 8: Improve organizational and institutional conditions for the success of TA-like activities
Understanding interaction mechanisms	Lesson 9: Acknowledge the dependence of TA organizations, in order to achieve independent advice with an impact

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Connecting to four spheres

Characterizing PTA

Research within the PACITA project shows that PTA organizations indeed establish and maintain multiple relationships with the four discerned social spheres. PTA organizations differ from each other to the extent that they interact (on the institutional, organizational, and project levels) with the four distinct social spheres. As we saw earlier, the mapping process in the PACITA project identified five distinct TA models that are currently operational in practice in the field of PTA. The PACITA research thus confirms that it makes sense – both conceptually as well as practically – to talk about PTA in terms of its relationship to four spheres – parliament, government, society, and S&T. Moreover, PTA can and does play out in many different forms, and these forms can all be effective in their own manner. Consequently, the following two lessons can be drawn:

Lesson 1: Understanding TA in informational and relational terms

From both a conceptual and a practical point of view, it is important to understand TA both in informational terms (as a form of science-based policy advice) and in relational terms. According to the relational view, it is essential to consider the relationships of knowledge sharing and trust that TA organizations build up and maintain with different societal spheres, such as parliament, government, society, and S&T.

Lesson 2: TA can effectively play out in many institutional and organizational forms

Each of the models identified in the study can be effective in a specific context.

Bridging PTA and non-PTA countries, and PTA and TA countries

Our model has been developed to characterize TA institutes. As a result, the model can be used to typify TA organizations that either do or do not have a parliament as one of their clients. This is illustrated by the Austrian TA organization ITA, which was characterized as 'shared government-science involvement in TA'. Our model thus creates an intellectual level playing field between PTA and TA organizations, and also between PTA

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and non-PTA countries, and even TA and non-TA countries. Creating such an intellectual level playing field has been a major drive behind the PACITA project because it is a necessary condition for mutual learning between PTA and non-PTA countries, which was the key objective of PACITA. Our inclusive model acknowledges the similarities between the various types of TA – ranging from parliamentary towards constructive TA and even non-institutionalized forms of TA – and enables us to study the similarities and differences between the various TA organizations and their activities. Based on this argument, we draw two further lessons:

Lesson 3: Intellectual level playing field is needed between PTA, non-PTA, and TA

The relational conception of TA creates an intellectual level playing field between PTA and non-PTA countries, between PTA and TA organizations, and treats various types of TA-like activities on an equal footing. This is a necessary condition for stimulating a mutual learning process between different countries, organizations, and TA-like activities. This perspective is also needed to show the added value of TA within the broader network of S&T governance activities.

Lesson 4: When setting up new TA organizations, consider the whole institutional possibility space

Since TA can play out in many different forms and since each can be effective in a specific context (see lesson 2), countries with an interest in setting up TA are encouraged to consider the whole 'possibility space' in order to select the model that is particularly suited to their political and societal demands and their institutional contexts.

TA and the governance of S&T

TA plays a role in the broader challenge of the democratic governance of S&T. Since our model treats various types of TA institutes and various types of TA-like activities on an equal footing, it opens up possibilities to study to what extent various TA institutes within a national or international setting can complement each other. In order to understand the complexities of the governance of S&T, there is a strong need to reflect on the interaction between the various research and engagement processes in the various social spheres and to reflect on the organizational and institutional constraints that these processes encounter. Such a

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comprehensive approach is especially needed to get to grips with the particular added value of TA within the broader national network of S&T governance activities.

Lesson 5: Acknowledge the organizational and institutional constraints that the governance of S&T may face

In order to understand the complexities of the governance of S&T, we need to reflect on the interaction between the various research and engagement processes in the various social spheres and to reflect on the organizational and institutional constraints that these processes encounter.

Long-term institutional dynamics and adaptability

Appreciating the dynamics of TA on the institutional level is crucial for the future of TA, with regard to creating new institutions and maintaining existing institutions or adapting them to new political demands. Our model makes it possible to study the institutional development of a TA organization over a long period of time. The PACITA project shows that we need to take into account a long-term perspective to get to grips with that process. For example, it was found that in many countries the political debate about setting up PTA took a long time, often more than a decade. Moreover, existing institutes may radically or gradually change their institutional position.

Lesson 6: TA institutes need to adapt to changing demands

Over a longer period of time, the political and societal demands for TA change. In order to survive, existing TA organizations have to adapt to these changing circumstances. The 'space of possibility' offers ample opportunities for such adaptation. For example, a country may first set up a TA organization and later on gradually develop its PTA capacity, by building up stronger relationships with parliament and include parliamentary TA types of activities.

Making connections on the micro-, meso-, and macro-levels

Our model stresses that the relationships between the TA organization and the various social spheres are developed and maintained on three levels, each of which has its specific features and dynamics. Up till now, most research efforts have been put towards understanding and mapping

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the relationship between PTA and parliament on the institutional level. The country reports of the PACITA project (PACITA 2012) is one of the first attempts to get to grips with how the relationship between PTA and the parliamentary process is shaped on the project level. Although these, often personal, contacts on the practical level often have a major effect on the impact of PTA, these types of activities of a PTA institution are rarely mapped or reflected upon. And how contacts between PTA and parliament are shaped on the organizational level is well known for PTA organizations that work very close with parliament, but they are far less known for the PTA organizations that operate at a distance to parliament. In addition, even less is known about the way in which PTA organizations set up and maintain relationships with the other three social spheres: government, S&T, and society. Here another complexity pops up in that these spheres consist of networks of organizations. It would be valuable to have more knowledge about to what extent and in what way a TA organization organizes and maintains its connections with various clusters of organizations (e.g. different governmental institutions.

Lesson 7: Foster relationships on the institutional, organizational, and project levels

Relationships between TA organizations and the various social spheres are developed and maintained on the institutional, organizational, and project levels. So far, literature on PTA institutions has focused on the institutional relationship between PTA organizations and parliaments, and too little attention has been given to the relationships of such organizations with the other social spheres and how contacts are shaped on the organizational and project levels.

Organizational and institutional conditions for successful TA projects

The description of TA methods often focuses on the project level. Our model implies that the impact of a certain method will also depend on institutional and organizational conditions. This dependency has received little attention from both scholars and policy makers. Most methodological descriptions take for granted that a TA organization with the proper human capacity and skills exists to perform the method and that such an organization has the proper institutional mandate

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to perform the method. This, however, is not the case, neither on the national nor on the international level.

An important question that will be addressed is: if a particular TA method developed at the national level is used on the European political level, then to what extent does the impact of that method depend on well-developed relationships between TA and the political system on an institutional and organizational level?

At the moment, the notion of responsible research and innovation (RRI) politically frames, enables, and constrains contemporary discourse on how to properly enact the democratic governance of innovation. In the context of Horizon 2020, many TA-like RRI activities will be sponsored and set up. Also, in this context, it is important to address not only methodological questions, but also questions about the organizational and institutional conditions needed to guarantee a proper impact of those activities.

Lesson 8: Improve the institutional and organizational conditions for success of TA-like activities

The policy impact of a certain TA method will depend not only on the quality of the method and the result but also on whether well-developed relationships exist between TA and the political and governmental sphere, both on the organizational level and on the institutional level. It is important to strive for such conditions in case of TA-like RRI activities that are sponsored in the context of Horizon 2020.

Understanding interaction mechanisms

Many TA organizations, in particular PTA institutions profile themselves as independent organizations. By taking a relational perspective, our model stresses that creating and maintaining bonds with clients and other relevant actors is crucial for being relevant and having an impact. By acknowledging the dependence of TA on the four social spheres, the way in which interactions between TA and the four social spheres are exactly shaped on the three levels that we distinguished becomes an important research issue. In other words, it is relevant to open up the black box of the interaction between TA and parliament, government, S&T, and society and to study the interaction mechanism used by TA organizations. So the crucial challenge for TA organizations therefore is to deliver independent, trustworthy forms of science-based policy advice and maintain good relationships with the various social spheres

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at the same time. In this way, independent advice, good relationships, and impact on policy can all be achieved in the long run

Lesson 9: Acknowledge the dependence of TA, in order to achieve independent advice with an impact

The challenge for TA organizations is to deliver independent, trustworthy, science-based advice and at the same time establish good relationships with the various social spheres.

Note

1 See also PACITA Deliverable 4.3 'Expanding the TA-landscape' and Chapter 2 of this book.

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