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The 'fit' between forward-looking activities and the innovation policy governance sub-system: A framework to explore potential impacts

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ABSTRACT

Forward-looking activities (FLAs) can influence innovation systems in various ways to a significant extent. This paper focuses on changes induced by FLAs in the innovation policy governance sub-system (IPGSS) of a given national innovation system. Our knowledge is surprisingly limited even on this subset of FLA impacts, despite several decades of practice and non-negligible analytical efforts. We identify key features of FLAs and IPGSS in order to explore hypotheses on the likely 'fit' between different types of FLAs and various IPGSS. Countries selected to illustrate the relevance of our analytical framework include Germany, Greece, and Hungary. Our intention is to contribute to a more refined conceptual framework concerning the role and likely impacts of FLAs. Further, as a better understanding of impacts supports the design of more appropriate and effective FLAs, as well as more insightful evaluations of FLAs, this approach is of practical relevance, too.

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1. Introduction

Forward-looking activities (FLAs) have been in the toolbox of science, technology and innovation (STI) policies for several decades. They can influence national, regional and sectoral innovation systems in various ways to a significant extent by introducing new policies and institutions ('rules of the game') governing the behaviour of, and interactions among, the main players, as well as creating new 'nodes' in these systems (e.g. new policy-making bodies, research and innovation performing organisations, or those facilitating these activities). Of these many types of potential changes this article focuses on changes induced by FLAs in the innovation policy governance sub-systems (IPGSS) of the national innovation system (NIS). Our knowledge is surprisingly limited even on this subset of FLA impacts, despite several decades of practice and non-negligible analytical efforts. What we know is based on individual case descriptions or evaluation reports – rather than systematic comparative analyses.

A possible reason for this knowledge gap is the wide variety of FLA approaches and methods ranging from highly participatory to expert-based ones and from creativity-driven to evidence-based

exercises.¹ Further, R&D and innovation (RTDI) activities, to be influenced by FLAs, are complex in nature. Complexity applies *a fortiori* to innovations systems, as shown by evolutionary economics of innovation. Thus, reconsidering existing theories on innovation systems and our current knowledge on FLAs in a new, systematic way is likely to improve our understanding.

The innovation policy governance sub-system contributes to identifying and prioritising certain policy needs and problems in a given innovation system, on the one hand, and translates insights from FLAs into policy actions, on the other. Overall, analysing actual or exploring potential impacts of FLAs on national innovation systems requires handling a great deal of diversity, both with regards to FLAs and the IPGSS, in which they are embedded.

¹ We can only indicate the richness and diversity of FLAs by referring to Amanatidou and Guy (2008); Cagnin et al. (2008); Coates et al. (eds) (2010); Fleissner et al. (1998); Gavigan and Cahill (1997); Georghiou et al. (eds) (2008); Gokhberg et al. (eds) (2016); Grupp (Ed.) (1999); Meissner et al. (eds) (2013); OECD (1996); Porter (2010); Salo and Cuhls (eds) (2003). We assume that the interested readers are well aware of the conference series on *Future-oriented Technology Analysis (FTA)* organised by the IPTS (EC JRC) since 2004, the ensuing special issues of *foresight, Futures, Science and Public Policy, Technology Analysis and Strategic Management*, and *Technological Forecasting and Social Change*, the briefs and reports produced by the ESTO Mapping project, the European Foresight Monitoring Network, the European Foresight Platform, as well as several outcomes of actual FLA projects.

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Hence, we present a framework as the basis for exploring hypotheses on the likely ‘fit’ between FLAs and IPGSs; or from a different angle, on the potential impacts of different types of FLAs in different settings. The relevance of this proposed framework is to be tested by reconsidering actual cases of FLAs, relying on available analyses. This framework could be used by policy-makers who consider launching an FLA project, practitioners designing that, as well as by analysts conducting ex-post evaluations.

The article draws on a rich literature covering various fields of theories from innovation economics, policy governance studies, policy evaluation research, as well as case studies and the authors’ practical experience. The conceptual framework, mainly relying on evolutionary economics of innovation and the policy governance literature, is introduced in Section 2. Then we characterise FLAs and IPGSs with the specific aim to explore an interrelated set of hypotheses on the likely ‘fit’ between different types of FLAs and various IPGSs in Section 3. These observations might contribute to future theorising on FLAs, on the one hand, and could be used as a ‘focusing device’² when designing or evaluating FLAs in practice. While we believe that our approach can be extended beyond national innovation systems (to sectoral or regional innovation systems), here we concentrate on the national level. The possible use of the proposed framework is illustrated in Section 4 by brief analyses of actual FLA projects conducted in Germany, Greece, and Hungary. We can only make this first step here; for a thorough test more cases would need to be assessed, and then some of our current hypotheses might have to be revised. Finally, Section 5 offers some conclusions regarding the wider applicability of this framework both for the design (or ex-ante impact analysis) and ex-post evaluation of FLAs.

2. Conceptual framework

FLAs do not have a single, all-encompassing theory to underpin them; rather, they rely on a range of – somewhat overlapping – theories and methods, including evolutionary and institutional economics of innovation; other branches of economics; sociology of science and technology; statistics; actor–network theories; political sciences; analyses of policy processes; systems theories; social psychology; theories on communication, co-operation, and participation; as well as decision-preparatory, (project) management and future-oriented methods and techniques.³ This list is far from being exhaustive, and most likely several disciples of these theories would change the grouping or the ‘labelling’ used here. That might be an interesting discussion, indeed, for theoretical purposes (Öner, 2010; Piirainen and Gonzalez, 2015). Yet, our intention here is just to indicate the complex nature of FLAs, rather than attempting to provide a meticulous, comprehensive treatise

² This metaphor was probably first used by Rosenberg (1969), and then frequently used and extended by STS and systems of innovations scholars. In a recent interpretation, a focusing device “helps to see, understand and control phenomena that could not be seen, understood or controlled without using this (or a similar) concept. In this sense it does what theory is expected to do: it helps to organize and focus the analysis, it helps to foresee what is going to happen, it helps to explain what has happened and it helps to give basis for rational action.” (Lundvall, 2007: 99)

³ The order, in which these disciplines are listed here, does not indicate their importance in any sense. The literature on these strands of theories is so huge that any attempt to identify the most important contributions would be pretentious; hence only a few pieces of work can be referred to here, in a somewhat arbitrary way: Bauchspies et al. (2006); Bijker (2010); Dosi et al. (eds) (1988); Edquist (Ed.) (1997); Fagerberg et al. (eds) (2005); Fagerberg et al. (2012); Freeman (1994, 1995); Georghiou et al. (eds) (2008); Hackett et al. (eds) (2008); Haegeman et al. (2013); Hall and Rosenberg (eds) (2010); Jasanoff et al. (eds) (1995); Joerges and Nowotny (eds) (2003); Latour (2005); Lundvall (Ed.) (1992); Martin (2012); Metcalfe (1998); Nelson (1995); Nelson (Ed.) (1993); and Pavitt (1999). Needless to stress, when a given FLA project addresses the futures of a certain S&T, economic, societal or environmental domain, it also relies on the disciplines that are relevant to the specific domain(s) or challenge(s).

on the congruence of these theoretical bases,⁴ let alone to construct a comprehensive, definitive theory of FLAs.

2.1. Evolutionary theorising, FLAs and implications for STI policies

Our discussion mainly draws on evolutionary economics of innovation and political sciences, in particular the policy governance literature. The former provides useful observations to understand the relevance of FLAs from different angles. Uncertainty and change are the underlying notions both for forward-looking activities and analyses on innovation processes and systems.

A principal thesis in evolutionary economics is that “innovation involves a fundamental element of uncertainty, which is not simply the lack of all the relevant information about the occurrence of known events, but more fundamentally, entails also (a) the existence of techno-economic problems whose solution procedures are unknown, and (b) the impossibility of precisely tracing consequences to actions” (Dosi, 1988: 222 – emphasis added). Thus, *optimisation* – the cornerstone of mainstream economics – is excluded on theoretical grounds.

The notion of uncertainty is of fundamental importance not only for theoretical analyses; it also has several policy implications. First of all, relying merely on analyses of the current state, performance and deficits of innovation systems as the basis for devising STI policies is insufficient: this approach ignores the fact that the future can be (structurally, fundamentally) different from the past and the present. No doubt, tackling current shortcomings is necessary, but – in view of uncertainty – it must be complemented by forward-looking approaches to policy development and governance.

Secondly, dealing with future developments has been pursued for many years under the heading of forecasting, which is based on the extrapolation of (supposedly) known trends. The space of events, in which *forecasting* can be meaningful is strictly limited: the only certain – and thus easily predictable – feature of innovation activities is that most of the underlying technological, business, and societal trends can change quite radically even in the space of 10–15 years.⁵ The scientific and policy relevance of forecasting is thus limited, as it ignores the existence of fundamental uncertainty associated to innovation.

From a policy perspective, therefore, new methods are required, which can take uncertainty into account during a decision-preparatory process. Certain types of FLAs, most notably *foresight*, are prominent from this angle, for two reasons. First, it is capable of dealing with uncertainty by devising multiple (fundamentally, qualitatively different) ‘futures’ (visions of future, future states). Second, participatory FLAs – that is, foresight processes – can reduce uncertainty, too, because participants can align their endeavours once they arrive at a shared vision. To this effect, however, it is a necessary condition to involve the major stakeholders, who not only can enrich outlooks on multiple futures drawing on their wide-ranging knowledge, experience and perspectives, but also significantly influence the underlying trends by

⁴ A diversity of theoretical underpinnings, approaches and methods can be a rich and valuable resource in the early phase of formation of an epistemic community, but it could turn into an obstacle once the community becomes more established. „Starting with the very first FTA conferences, participants have signalled their concern that an excessive disparity of interests, theoretical starting points, terminologies and expected outcomes could undermine the utility of such gatherings for both researchers and policy makers. (...) a lack of shared sense-making frameworks might make it impossible to determine if presentations and debates at FTA [conferences] contribute to a deeper understanding of far-flung experiences and research or, on the contrary, simply provoke conflicts and confusion due to misunderstanding. (...) All of which threatens to undermine the credibility and relevance of anticipatory thinking for decision-making.” (Marinelli et al., 2014: 2–3)

⁵ Obviously, there are certain trends, e.g. demographic ones, which are not directly influenced by RTDI activities, on the one hand, and their ‘stability’ (predictability) extends to a much longer time horizon (in this case around 40–50 years), on the other. Also, the pace and intensity of RTDI activities – and hence their impacts on major technological, business, societal and environmental developments – vary significantly across time (different historical periods) and countries (socio-economic systems).

shaping the strategies or policies of their respective organisations, be those government agencies, businesses, research organisations, NGOs, unions, or other types. Their shaping ability ('agency'), of course, depends on the issues in question, as well as on the political and decision-making culture of the 'entity' conducting a foresight programme: international organisations or regions, nation states, sub-national regions, business associations, groups or individual firms, cities, etc.

Innovation studies have also shown that innovators are *not lonely champions* of new ideas. While talented individuals might develop radically new, brilliant scientific or technological concepts, successful innovations require different types and forms and knowledge, rarely possessed by a single organisation. A close collaboration among firms, universities, public and private research organisations and specialised service-providers is, therefore, a prerequisite of major innovations. Forms of innovation co-operation can vary widely from informal communications to highly formalised RTDI contracts, alliances and joint ventures (Freeman, 1991, 1994, 1995; Lundvall and Borrás, 1999; OECD, 2001; Smith, 2000, 2002; Tidd et al., 1997). Thus, conscious network-building efforts of participatory FLAs are crucial, indeed – as well as their unintended impacts on networking.⁶

Evolutionary accounts of innovation lead to sobering lessons concerning the very nature of policy-making, too: in a world of uncertainty, policy cannot bring about *the* optimum either. Further, given the importance of variety, selection and uncertainty, the potentially successful policies are *adaptive* ones, that is, they rely on, and learn from, feedbacks from the selection process, which is, in turn, leads to further variation (Metcalf and Georghiou, 1998). In other words, policy formation is a learning process (Lundvall and Borrás, 1999). Several types of policy failures have also been identified by analysts (Edquist, 2011; Malerba, 2009; Metcalf, 2005; Smith, 2000), of which at least three types can be tackled by FLAs, namely the lack of understanding of sectoral characteristics and dynamics, poor (or lack of) vision building, and ineffective co-ordination. Whether these positive impacts materialise certainly depends on the embedding and quality of implementation of a given FLA project, as well as on a range of contingent factors beyond the control of those who run that FLA (Weber et al., 2012). It can be argued, however, that certain types of FLAs can contribute to design appropriate policies: more 'robust' policies can be devised when (i) multiple futures are considered, and (ii) stakeholders, given their diverse backgrounds, bring wide-ranging accumulated knowledge, experience, aspirations and ideas into policy dialogues (Amanatidou, 2014; Cassingena Harper, 2016; Georghiou et al. (eds), 2008; Havas et al., 2010).

2.2. Governance of innovation systems

In line with these evolutionary insights into what policy can deliver (or not) with regard to innovation, governance studies have also recognised the limits to hierarchical political steering (Peters and Pierre, 1998). This problem is not specific to innovation; it applies to many other policy domains as well. Social systems show complex features such as self-organisation and self-referential behaviour, and are also subject to the influence of contingencies and wider contextual developments, and thus they easily escape any attempt of targeted control (Weber, 2009).

The initial response to these recognised limits to control is reflected in the growing prominence of context control (Willke, 1995) and more specifically in the rise of the so-called New Public Management principles (NPM). Without going into details of the NPM debate, contractual and market relations between ministries (or other government bodies) as principals and subordinate organisations (e.g. universities, funding

agencies, research organisations, etc.) as agents have been introduced (Verschuere and Vancoppenolle, 2012). This form of institutionalising the interfaces between government and other organisations recognises the autonomy of these organisations, but subjects them to strategic goal-definition and resource allocation. Hierarchy as an organising principle is thus still maintained, while market relations are also used for operationalising political control.

In the meantime, it has become obvious that NPM is facing a number of challenges. One of these concerns the ability of the agents in defining their strategies autonomously, due to the knowledge gap between them and their principals. A second challenge, of particular relevance in the context of FLAs, has to do with the lack of co-ordination between highly autonomous self-governing organisations. Coherence of policy strategies in, and beyond, the innovation policy domain is crucial for addressing major societal challenges and realising transformative changes, but no government can ensure this type of coherence by way of centralised hierarchical steering. This challenge is exacerbated by the fact that coherence needs to be sought not only with regard to the strategies and actions of public actors, but also with regard to private sector agents.

The response of governance studies to these challenges consists of proposing network-type arrangements as a means to induce a higher degree of coherence, as well as co-ordination of strategies and actions on an otherwise segmented landscape of policy domains (Hartley 2005). In fact, the notion of 'governance' is already a reflection of the need to understand change processes in society as the result of public as well as private and third sector activities (Rhodes, 1997). Foresight, understood as a forward-looking and participatory activity dealing with open futures, is a means to reinforce network-based co-ordination and coherence of actor strategies.

Innovation policy governance sub-systems (IPGSs) are in charge of overseeing the governance of STI policy processes, which involve several non-governmental actors, too. Collective initiatives are launched, problem perceptions and agendas defined, new structures and institutions to steer and shape innovation systems established. Foresight can play a major role in preparing and implementing such activities triggered by the IPGS. It is also likely to have a major impact on the IPGS itself by promoting the use of participatory and pluralistic approaches to decision-making and policy implementation. As already noted, policy-setting processes are learning processes, just as innovation processes, and FLAs are important policy tools to shape innovation systems and future innovation activities. IPGSs are also the locus where these learning processes need to be triggered, guided and orchestrated.

It is against this backdrop that the nature of policy formation processes and the policy rationale of FLAs should be clearly understood (Havas, 2005, 2011), as a precondition for achieving a good 'match' between an FLA project and the respective IPGS, and thus for enhancing the effectiveness of FLAs to be conducted. Understanding and systematising this relationship between the IPGSs, and assessing how the 'fit' between the two contributes to enhancing the likelihood of achieving positive impacts with FLAs, are the main ambitions of this article.

3. Systematising the relationship between forward-looking activities and innovation policy governance sub-systems

3.1. Key dimensions of forward-looking activities and innovation policy governance sub-systems

A first step towards systematising the relationship between IPGS and FLAs is to understand their nature on their own. To characterise IPGS and FLAs we extract three key dimensions from the available literature. The discussion of these decisive features serves as a starting point to analyse some illustrative cases of FLAs (Section 4). The IPGS dimensions are used to characterise the particular IPGS in the different cases and discuss their relationship with the respective FLA under study, in particular with regard to their influence on the impact of the FLA.

⁶ The benefits in this respect include strengthened existing networks, formation of new ones, and more generally, enhanced communication and co-operation among different actors involved in innovation processes.

3.1.1. Decisive features of innovation policy governance sub-systems

Policy governance sub-systems (IPGSs) are a key part of innovation systems. Their role is to oversee the strategic orientation and guidance of the transformation of innovation systems.⁷ In other words, the IPGS is a locus where the priorities, organisational and institutional settings, and regulations are defined that guide or provide incentives for decision-making by RTDI performers.

FLAs are often initiated to prepare and trigger changes in innovation systems, such as structural and institutional change processes or the definition of new thematic agendas. The results of FLAs by definition refer to future developments and spark implications with regard to strategies of private and public sectors actors, as well as of intermediaries in the innovation system.

We argue that FLAs can play a major role in guiding the strategic orientation of innovation systems if they are well connected to, or embedded in, the policy governance sub-system. For deriving generalised conclusions regarding the match or mismatch between a certain FLA project and a given IPGS, it is thus important to characterise IPGSs by identifying their decisive features from this angle.

In line with our emphasis on *national* innovation systems and corresponding FLAs we highlight key dimensions that characterise IPGSs at the same level. Of course, an IPGS is not isolated from the context in which it is embedded. This applies first of all to the wider governance system, and hence we borrow insights from the general policy governance literature to identify key dimensions to characterise IPGSs. Secondly, there is a wider social, cultural and institutional context that matters for the potential role that FLAs can play in shaping innovation systems. We argue, however, that the influence of these wider contextual conditions on FLAs is mediated through the IPGS.

IPGSs can be characterised along several dimensions. Könnölä et al. (2009), drawing on Tukker and Butter (2007), as well as the cultural theory of Thompson et al. (1990), suggest two key dimensions (related to the importance of rules and of group ties) that determine four modes of governance of transformation and change: competition, co-existence, co-operation and integration. Hofstede (2001), also taking a cultural perspective as a starting point, characterises governance cultures in terms of power distance (inequality between people), uncertainty avoidance (level of stress in society related to an unknown future), individualism vs. collectivism (the integration of the individual into primary groups), and masculinity vs. femininity (division of emotional roles between man and women).⁸ Drawing on these two main sources of inspiration, and complemented by our own experience, we suggest three main dimensions to characterise IPGSs, which – for reasons of simplicity – we define in binary terms:

- **Power structures:** Political power can be organised in different forms. Governance can be centralised in a few hands, with a quite centralised hierarchical control. As there is usually no single centre of power, it is appropriate to speak of an *oligopolistic* setting as one extreme of the spectrum. At the other end are the decentralised approaches to governance, i.e. IPGSs where power is *distributed* among many actors. As examples of the former, Central and Eastern European countries can be mentioned (at least until the early 1990s), but also some Asian countries with autocratic and strongly hierarchical features. In contrast, several Western European countries have developed systems of

distributed governance, with many different players contributing to the definition of innovation policy at various policy governance levels and in diverse policy domains (Kuhlmann, 2001). The more recent discussions on governance models stress the critical role of networks for bridging between different policy domains and levels, in spite of these being organised along the lines of hierarchical systems (Hartley and Benington, 2006). In other words, networks aim to bring in elements of decentralisation in structurally oligopolistic IPGSs.

- **Political-administrative culture:** A second important dimension of IPGSs refers to the political-administrative culture, which differs from political culture at large by concentrating on the organisational, institutional and administrative aspects of it. As main archetypes, we distinguish an *antagonistic* IPGS from a *consensual* one. An antagonistic governance model is characterised by strong majority-led elements that is balanced by regular changes in power. But it is also about strictly demarcated policy domains and levels, where defending the respective terrain is a key part of the underlying logic. The consensual model is, on the contrary, driven by a permanent involvement of all relevant stakeholders in decision-making, even if they are not in power formally. Changes in government thus do not lead to major ruptures in policies, as positions of all actors have already been integrated in strategies and measures. The distinction between the two extremes can be exemplified suitably by the British model of governance, on the one hand, which relies on antagonistic and majority principles ('the winner takes it all'), and the Dutch and Scandinavian democracies, on the other, which have strong elements of consensus orientation.⁹ Countries with a stronger corporatist tradition like Austria or Germany fall also within the consensual category, but the corporatist model also tends to show more oligopolistic features than the 'open' democracies (Rhodes, 1997). In between these two extreme archetypes, different variants are possible. Purely consensus-oriented systems could easily enter into stalemate situations, because political choices often imply that there will be winners and losers.¹⁰ Most, if not all, countries currently struggle to find ways to achieve better horizontal and multi-level co-ordination to tackle complex policy problems (Kaiser and Prange 2005).
- **Reliance on strategic policy intelligence:** Governance systems differ in terms of the extent to which policy preparation tools (PPTs) are used to devise, implement and monitor policies. FLAs are just one among other types of tools used to prepare policies: PPTs also include, for instance, monitoring and evaluation activities, formal and informal consultation mechanisms (e.g. technology assessment), and system analysis (Tübke et al., 2001). It seems useful to distinguish countries that rely on a whole spectrum of PPTs *systematically* and consciously to support the governance process from countries that use PPTs rather *sparsely*.

3.1.2. Key characteristics of forward-looking activities

There are several taxonomies of FLAs,¹¹ but with regard to the impact of FLAs, it is more fruitful to concentrate on the nature (the key characteristics) of a given FLA process and the role it is intended to

⁷ Just to avoid some potential misinterpretations, besides policy-making (public) bodies, various RTDI performers (universities, public and private non-profit research organisations, firms), as well as other major stakeholders (interest groups, etc.) are also major actors of the innovation policy governance systems: they can, and indeed do, influence STI policies in various ways.

⁸ Hofstede's argument can only partly be adapted to our needs, because while we are looking into structural characteristics of IPGS, his emphasis is on the role of the individual. This is why his fourth dimension, referring to emotional roles, is not considered further in our framework. For an attempt to apply two Hofstede dimensions when analysing national level strategy-setting processes, see Andersen and Rasmussen (2014).

⁹ The 'varieties of capitalism' literature provides deeper insights into this differentiation (Hall and Soskice (eds), 2001; Hall and Thelen, 2009).

¹⁰ The debate about the construction of new power grids as a pre-condition for the German 'Energiewende' is a good example; see, for instance, Moss et al. (2015).

¹¹ See for instance the five 'generations' of foresight (Miles et al., 2008), extended from the original version of three 'generations' suggested by Georghiou (2001). Another approach considers the rationales of FLAs, i.e. whether they focus on identifying promising S&T fields, lucrative techno-economic opportunities, or emerging socio-economic challenges (Havas, 2005, 2011). A third one focuses on the rationales, the transformation types, the organisational forms, and the governance modes through which foresight activities are implemented (Weber et al., 2012).

play in the NIS. Drawing on the frameworks developed by Havas et al. (2010) and Weber et al. (2012), we suggest using the following three dimensions:

- **Visibility of FLAs:** When an FLA project is given pronounced publicity and political prominence we can speak of a *highly visible* FLA. These FLAs can have a clearly identifiable impact, if appropriately geared to the conditions of the given IPGS. In these cases, though, synergies with other PPTs may not be fully exploited (if at all). In contrast, a *'hidden'* FLA project is run in parallel with other FLAs and/or a broad range of other PPTs. Its observed impacts, therefore, could easily be attributed to other PPTs. The potential for synergies of a given FLA project with other PPTs (in particular innovation systems studies and evaluations), and thus for more appropriate and effective STI policies, is higher though when an FLA project is embedded in this integrated set of PPTs. From a different angle, while there seems to be a strong link between the systematic vs. sparse use of PPTs in a given IPGS, on the one hand, and the visibility of a specific FLA project, on the other, it is nevertheless important to consider the visibility of an FLA project on its own, too, when trying to identify and analyse its impacts.
- **Degree and type of participation:** *Highly participatory* FLAs can exert an influence on the NIS through a range of channels. They allow establishing an interface between different types of NIS actors. In other words, they contribute to 'wiring up' the NIS (Martin and Johnston, 1999) because they are participatory. They also promote broad-based learning about the system (its elements and characteristics; backgrounds and views of actors, tensions among them) and facilitate the implementation of policy proposals.¹² In contrast, certain FLAs are much *less participatory* and are constructed as 'rapid' policy advisory projects. These usually rely on a small group of experts to support a specific policy initiative and thus are likely to have immediate, strong, and easily identifiable policy impacts.
- **Purpose:** We distinguish FLAs aimed at *setting thematic priorities* from those aimed at *inducing systemic changes*. Many FLAs are aimed at improving the performance of a NIS by identifying appropriate S&T priorities and focussing resources on those domains. A different type of objective is to induce significant structural changes in the NIS. These FLAs can aim at overcoming various types of lock-in situations, including sectoral or thematic ones in various S&T fields (failures to generate new technological opportunities, lock-in in inferior technology) or structural ones (e.g. weak learning capabilities of firms, poor business-academia co-operation, lack of internationalisation). These FLAs are likely to question the prevailing power structures and challenge the dominant constituencies of actors, and thus are inevitable when there is a strong need to overhaul the IPGS itself (e.g. in terms of STI policy rationales, its overall decision-making culture and methods; efficacy of STI policies; efficiency of public spending). High level of participation tends to strengthen the transformative potential of FLAs by creating new 'wires' – occasionally new nodes, too – in the NIS.

3.2. The main hypothesis: the compatibility between the IPGS and FLA

The underlying hypothesis of our paper is that the closer the 'fit' between a chosen type of FLA and the innovation policy governance sub-system in which it is (to be) conducted, the stronger and more favourable the impacts of the FLA project are expected to be.¹³ This

¹² In case of a foresight programme, participants are owners of a shared vision, as well as the policy proposals derived from that vision; and as they are also actors in the NIS, they can act upon these proposals.

¹³ This hypothesis is obviously based on the auxiliary assumption that the FLA project is conducted in a methodologically appropriate, sound way. Henceforth FLA (in singular) denotes an FLA project, with its chosen approach and methods. These two terms (i.e. FLA project and FLA), thus, are used interchangeably.

argument does not exclude that other contextual factors might come into play and affect the impacts either positively or negatively. Therefore, such 'other' factors are taken into account in the case analyses, and if they turn out to be highly influential in a specific case, this would be taken into account in the impact analysis.

The notion of 'fit' should not be understood as a static and linear concept. FLAs and IPGSs influence each other in the course of time. There are interactions among them. The type of FLA is likely to exert an influence on the nature of the innovation policy governance sub-system: a non-participatory FLA project would reinforce the oligopolistic character of an IPGS, while a participatory FLA would tend to open up the IPGS towards more distributed decision-making. In the longer run, and with ensuing tensions, of course such an effect might even lead to an FLA having a transformative impact on the IPGS. In fact, an initial lack of 'fit' between IPGS and FLA might enable transforming an IPGS under specific favourable circumstances.

The three plus three 'dimensions' proposed in Section 3.1 lead to 8 combinations both for FLAs and IPGSs. Obviously, we cannot analyse all the possible 64 combinations in a single paper, and thus concentrate on those FLAs only that are intended to induce systemic changes (that is, 4 of the 8 possible combinations of FLAs, Table 1), and discuss briefly how the different dimensions of the IPGS would hinder or facilitate a certain FLA of these four.¹⁴

FLA Task Force would be compatible with a *distributed* and *antagonistic* IPGS, in which a certain set of actors can initiate this type of FLA to strengthen their position by changing the IPGS itself or with the intention to induce changes in other sub-systems of the NIS to improve performance. In contrast, an *oligopolistic* IPGS would be more compatible with an FLA aimed at *setting thematic priorities*, launched by the dominant actors. That FLA would further strengthen the position of these actors. Further, the same type of FLA would better fit into a *consensual* IPGS, because a *transformative* FLA, that is, the one aimed at inducing systemic changes, would most likely increase tensions among the key stakeholders, and that would be against the main cultural feature of a consensual IPGS. Finally, the third dimension of IPGSs, namely *reliance on strategic policy intelligence* seems to be neutral vis-à-vis this type of FLA: where PPTs are used systematically, FLA could be launched either for inducing systemic changes (but in that case mainly to transform specific sub-systems of NIS, other than the IPGS itself because the systematic use of PPTs is an indication of a reasonably well functioning IPGS) or setting priorities. In the case of systematic use of PPTs an FLA can be made highly visible by disseminating its results in high profile reports, posting well-written highlights at widely visited websites, organising press conferences, seminars and other events attended by well-known experts, opinion leaders, high-ranking policy-makers and politicians.

The Greek National Technology Foresight Programme, one of the cases presented in more detail in the next section to illustrate the possible use of our framework, can be positioned in between two ideal types of our tentative taxonomy, namely an *FLA Task Force* and *FLA Dialogue*, given its *moderately participatory* nature. It is no surprise at all that an actual case 'sits' in between ideal types.

FLA Analysis: Fairly similar considerations apply to this type of FLA (compared to *FLA Task Force*), except for its visibility. In this case either there are no dedicated efforts to make it highly visible, or these efforts are not successful for some reasons, e.g. given the richness of the PPT palette.

The other two types of the above four, namely *FLA Dialogue* and *FLA Culture* are characterised in more detail in the next section by describing real-life cases, that is, Hungary's TEP, and Germany's BMBF Foresight, respectively.

¹⁴ We have deliberately avoided suggesting a similar typology of IPGSs and developing hypotheses on the match or mismatch between FLA types, on the one hand, and IPGS types, on the other. This would not give justice to the multi-faceted nature of IPGSs, which we have tried to capture in an already simplified way in the three key dimensions identified in Section 3.1.1.

Table 1
Four ideal types of FLA projects for systemic changes.

	Low level of participation	High level of participation
Highly visible	FLA Task Force	FLA Dialogue
Hidden among other PPTs	FLA Analysis	FLA Culture

Source: own compilation.

4. Illustrative cases

To illustrate how to use our proposed framework for ex-post evaluations, we analyse three cases below, by answering a basic question, followed by subsequent ones.

- Has this FLA, according to an external evaluation, had a systemic impact?
- o If yes, how well has the nature of the FLA fitted with the IPGS dimensions? Have any other success factors been identified?
- o If not, what have been the reasons? To what extent has a mismatch between the FLA and IPGS dimensions been observed? Have any other barriers that prevented a systemic impact from occurring been identified?

4.1. Greece: the National Technology Foresight Programme

The Greek National Technology Foresight Programme (NTFP) was the first large-scale foresight programme in Greece. It was conducted between 2001–2005 under the responsibility of the General Secretariat for Research and Technology (GSRT) of the Ministry of Development. It focused in particular on the question how science and technology could contribute to building a knowledge society with a 20-year time horizon (Damvakeraki, 2005).

Around the turn of the millennium, Greece was aiming to catch up with the more advanced countries of the EU. The Greek innovation system was characterised by fragmentation, a low level of business RTDI efforts, and insufficient co-operation between businesses and academia. Further, innovators had to shoulder high administrative burdens (Amanatidou, 2013). Hence, it performed rather poorly in several regards. The research system was dominated by universities and publicly financed research institutes, while the largest economic sectors (i.e. tourism, ship building) had a low level of R&D intensity.

Against this backdrop, the aim of the GSRT to use the foresight programme as a means to prepare a systemic change towards a knowledge society was rather ambitious, indeed.

Similar to the innovation system, the Greek *innovation policy governance sub-system* was quite fragmented and *distributed* at the turn of the millennium. The GRST may have been the dominant government actor in shaping STI policies but its influence on the strategies of the key research performing organisations was rather limited. Moreover, innovation-related agendas were also influenced by the Secretariat for Industry (GSI), while a significant share of the EU Structural Funds in government expenditures on RTDI was controlled by the Ministry of Economy and Finance (MEF). In terms of political-administrative culture, this policy domain was clearly demarcated, with limited space for consultation with other ministries or participation of stakeholders in the definition of STI policies. Political decision-making took place 'behind closed doors' (Amanatidou, 2013), leaving severely restricted opportunities for consensus building and policy co-ordination. Overall, the culture is to be characterised as rather *antagonistic*.

The National Technology Foresight Programme (NTFP) mainly aimed at developing guidelines and assisting the government in designing the national STI policy strategy and supporting businesses in their strategic planning processes. This effort was also intended to lead to the establishment of a national foresight observatory; an ambition that was never materialised. The foresight process was based on 13 thematic panels and five cross-cutting ones. While there was quite

some interest in the open call for experts to participate (700 expressions of interest were received), panels were dominated by academics, with rather limited participation of business, government and societal experts. The activities of panels were complemented by 'top-down' scenarios to frame the work of the panels (GSRT, 2005). While the set-up of the process can indeed be characterised as highly participatory, the imbalance in terms of panel composition, as well as the rather traditional style of running most panels, which gave room to limited engagement only, clearly restricted the participatory nature of the entire process. Thus, it can be characterised as *moderately participatory*. Overall, Greece had very limited experience with foresight and other participatory methods. The use of policy preparatory tools (e.g. evaluation, impact assessments, benchmarking, etc.) to inform policy-making was also limited. The unique character of NTFP and the extensive dissemination activities towards the end of the process made the Greek national foresight programme a *highly visible* endeavour.

With hindsight, the initial ambitions were at best partially achieved (Amanatidou, 2009, 2013). Some collaboration between experts from different areas was triggered by the exercise, but the limited involvement of private sector actors restricted the scope for forging new links in the innovation system. Fragmentation of the NIS, therefore, could not be overcome. Neither were bridges built across different policy domains affecting innovation activities and performance, mainly because the NTFP was largely perceived as an internal exercise of GRST.

While the quality of results varied a lot across panels, often depending on the leadership by the chairs and rapporteurs, policy recommendations were often perceived as too general: not practical and not specific enough for the advancement of the panel areas. Attention to innovation was limited by the fact that it was addressed by a dedicated panel, but not as a cross-cutting matter for all the thematic panels. In spite of a timely delivery of results, their take-up in policy-making was quite limited, not least due to the fact that priorities were not formulated in a sufficiently clear manner. The change in government in 2004 further contributed to delaying any follow-up actions. The longer-term ambitions of creating a foresight observatory and a foresight culture in Greece were not achieved. However, the open and participatory elements of NTFP showed that policy decisions need not be prepared behind closed doors by necessity.

The reasons for the limited success and impact of NTFP are manifold, but can be summarised in three groups. First, given the absence of prior experience with foresight, insufficient time and effort was spent on 'preparing the ground' for a large-scale foresight process. Smaller steps might have been more appropriate to build the necessary capabilities and experience – both in terms of conducting foresight and absorbing its recommendations. The NTFP was thus overambitious; there was a mismatch between the ambitions of the programme and its context.

The shortcomings of the set of methods chosen and implementation should be added as a second reason. Membership of panels was imbalanced; mainly traditional formats of interaction were chosen; and the implementation across panels was rather incoherent. The quality and specificity of results depended very much on the skills of rapporteurs, in particular. Overall, results were thus not interesting enough either for policy-makers, or business leaders. This was partly due to the limited experience, training and preparation of the participants. The International Advisory Committee could have been used more extensively to support and guide the entire process.

A third major issue relates to communication and dissemination of results. Inadequate efforts were made to translate panel results into useful insights and inputs for industry, with innovation playing a marginal role only. Communication between the client and the contractor was scant; policy-makers were involved too late in the process and not as 'co-producers' of policy proposals. Overall, they did not have a real sense of ownership of the results, also because of the rather general character of many panel reports. Hence, the GSRT as the main client showed half-hearted commitment to implement the recommendations, and there was no other foresight champion at a sufficiently high

political level to promote their use. It also needs to be acknowledged that the results of some panels (e.g. defence, health) were taken up in subsequent policy actions, but more could have been achieved with a different design and set up of the Greek NFTP.

4.2. Hungary: TEP

The Hungarian Technology Foresight Programme (TEP) was conducted in 1997–2000; that is, the first foresight programme in a former centrally planned economy. At that time the IPGS was *oligopolistic* (a few, centralised STI policy-making bodies at the national level, and hardly any decision-making competences at the regional level) with a prevailing *antagonistic political-administrative culture*. Some advanced policy-preparation tools (monitoring, system analysis, self-evaluation of a few policy tools) were used in an *ad hoc* manner, which was actually an achievement in a Central European context (compared to hardly any use of these tools until the early 1990s in these countries).

It is in this governance context that TEP was launched. The size of the country and the level of economic and social development played a decisive role in setting the objectives of the programme: it was driven by broad socio-economic needs and challenges, rather than a narrow S&T agenda.¹⁵ The overall objective of TEP was to contribute to a strategy for a socially, economically and environmentally sustainable development. More specifically, six goals were defined by the Steering Group: (i) contribute to a national innovation strategy based on a comprehensive analysis; (ii) help Hungarian firms improve their competitiveness by providing the results of this strategic analysis; (iii) strengthen the formal and informal relationships among researchers, business people and policy-makers; (iv) spread co-operative and strategic thinking; (v) support integration into the European Union; (vi) formulate recommendations for public policies. In other words, *setting thematic priorities* was part of a broader set of objectives, among which *inducing systemic changes* was perceived at least as important (if not more) as identifying new market and technological opportunities.

Fundamental organisations and institutions were still being shaped in Hungary in the late 1990s, given the transition process: the country was set free from the former Soviet bloc and attempted to join the EU, which was also in a middle of a major transition process. Thus the wider, international context, where Hungary was trying to find her room, was also changing. It was perceived as a crucial task to analyse this turbulent environment, hence a strong emphasis was put on devising multiple futures, both at macro level (socio-economic framework conditions) and at the level of panels (micro and meso level issues). It should be stressed that macro scenarios had not been developed in any other country engaged in foresight activities by 1997 (when TEP was designed).

The process was at its core based on the engagement of stakeholders in seven thematic panels, complemented by a two-round Delphi survey, and a series of thematic workshops. TEP panels had the freedom to follow their own ‘instincts’, and given the transition context, they devoted a significant part of their time and interest to non-technological issues, e.g. organisational and institutional development, including regulatory issues, although most members were S&T experts. Yet, faced with the pressures of the transition process in their day-to-day work, they understood the importance of non-technological issues. It was also reflected in the Delphi-statements, the survey results,¹⁶ and thus in the policy recommendations.

¹⁵ The legacy of the former socio-economic system, especially its all-pervasive hierarchical feature, had a strong impact on the major decisions on the organisation and management of TEP, too: it was decided that the Steering Group should not be directly influenced by the government agency that initiated and financed TEP; and the seven panels were also given a great deal of autonomy to break with the past in a highly visible and symbolic way.

¹⁶ This approach was validated by the respondents, too: more than half of the ‘top 10’ Delphi-statements – those deemed to be the most favourable ones by the respondents, i.e. with the highest combined socio-economic and S&T impacts – were non-technological in their nature (Havas, 2003: Table V).

Overall, TEP was a *clearly visible* foresight programme. It was based on a *highly participatory* approach and engaged a broad range of stakeholders. It pursued a double purpose, namely to *identify thematic priorities*, but as part of a broader ambition to *induce systemic changes* needed for establishing an innovation system that allows combining technological opportunities successfully with market demand and societal needs, and eventually contributes to improving the quality of life.

TEP was evaluated by an international team of experts in 2004. The evaluation report was based on interviews with key stakeholders as well as a survey (with 62 respondents, including 8 members of the Steering Group and 33 panel members, altogether 66% of the respondents). Over 60% of respondents saw high or very high effect in establishing a longer-term perspective and over 50% of them in formation of new networks (Georghiou et al., 2004: Fig. 1). Thus, at least some systemic changes have been identified.

As for impacts on policy, the evaluation report made a distinction between direct and indirect impacts: “The effects on public policy appear to have been much greater but were missed by initial analyses because they took much longer than expected to materialize – as one interviewee who was a policy user put it ‘a slow and non-linear process’.” (Georghiou et al., 2004: 5) The report also “indicates an impact both on the climate of thought in many policy areas and a series of indirect but significant effects on policy in several domains. It seems that TEP created a reservoir of knowledge that entered the policy system in a non-linear fashion, either through personal networks of participants or simply by having cogent text available when policies were being drafted. A note of caution needs to be sounded on causality – TEP reflected as well as initiated the policy discourse in Hungary. However, the specificity of the impacts suggests that it at least crystallized and almost certainly extended significantly thinking on many issues.” (Georghiou et al., 2004: 6).

The *antagonistic political-administrative culture* prevailing in the IPGS was a major cause of a lack of more visible direct impacts: “The reasons for lack of direct implementation lie, we believe in the implementation environment in which the programme was situated. Its origins within the OMF [the main STI policy-making body, that funded TEP] may initially have given it a welcome degree of freedom but with the radical change in nature of that organization and a change of government,¹⁷ there was no natural channel, nor an obvious champion in government able to act upon the results. Even if OMF had been unchanged, it was itself at a distance from some of the political decisions implied in the recommendations. (...) The problem was (...) lack of ownership of the results and hence commitment to acting upon them. As it turned out TEP had no clear client base that felt its questions were being answered, a situation made worse by the discontinuity resulting from political change.” (Georghiou et al., 2004: 6).

It seems that given the specific context of transition, in which it was important to stress the autonomy of TEP,¹⁸ there was a trade-off between intellectual freedom and the chance for greater impacts: “While greater engagement by some ministries would have been beneficial, reporting to them directly could have constrained thinking and lost the benefit of multidisciplinary within panels and learning generated through interaction between them.” (Georghiou et al., 2004: 6).

With hindsight, probably it is more useful to run an FLA with the potential of having some limited, ‘non-linear’, indirect, and cultural impacts than wait for ‘ideal’ circumstances. Had further FLA projects followed TEP, it would have been fairly easy to claim that introducing this new way of thinking – setting important changes in motion – is

¹⁷ The government changed in 1998, and OMF was fundamentally reorganised in January 2000 (became a division of the Ministry of Education from a stand-alone government office). Then the government changed again in 2002 and a new body, called National Office for Research and Technology was set up in 2004, that is, again a stand-alone government office.

¹⁸ As already highlighted, TEP was set up purposefully as a programme controlled by non-governmental experts, and in turn, the Steering Group delegated a great deal of autonomy to the panels.

worthwhile even at the price of limited success for the first endeavour. Yet, the first ever foresight programme launched in a former centrally planned economy has not been followed by any other major forward-looking activity for 15 years by now – not even at the request of the European Commission to devise a so-called smart specialisation strategy, preferably underpinned by a foresight programme, as a so-called ex-ante conditionality to get access to the EU Structural Funds in 2014–2020. That certainly begs a fundamental question: what factors have caused this apparent failure? Answering this question, however, would require a separate paper.

4.3. Germany: BMBF Foresight

The German BMBF Foresight was launched in 2007. This two-year process was the first of a series that should evolve into a revolving process of exploring future issues and challenges to underpin German STI policies (BMBF, 2008). Indeed, a second phase was launched in 2012, which is not considered in this analysis.

The German *innovation policy governance sub-system* (IPGS) is a complex one, not least due to the federal structure of the country, with important responsibilities (e.g. for education and universities) residing with the Federal States. BMBF, the Federal Ministry for Education and Research has major competences in devising research policies and is also funding important research programmes. The excellence initiative to provide top-up funding to leading universities and research centres, together with the High-Tech Strategy, intended to concentrate RTDI efforts on key areas of future promise, are important elements of the federal STI policies (BMBF, 2006), aiming to guide and structure the overall evolution of the German innovation system.

In terms of centralisation, the IPGS may thus have several poles, but it nevertheless resides on some major pillars. There are large research organisations (Fraunhofer, Helmholtz, Max Planck) playing a key role in conducting research next to universities and industry. Industrial research, while in general being widely spread, is nevertheless dominated by the activities of some big players (Volkswagen, Siemens, large chemical firms, and the like), who are regularly consulted on STI policy matters. Universities and some major research funding bodies (e.g. DFG) are also involved in shaping STI policies. German federalism injects an element of decentralisation into the IPGS, but in general the German IPGS can nevertheless be characterised as oligopolistic. The compartmentalisation of policy domains is generally quite pronounced, albeit explicit efforts made for many years to overcome dissociated research (and STI policy) domains. Both the High-Tech Strategy and the BMBF Foresight aimed at building bridges between fields of research, research funding and – to some extent – sectoral policies (BMBF, 2006; Cuhls et al., 2009). The political-administrative culture can thus be regarded as quite *antagonistic*, both within the STI policy domain and between STI and sectoral policies. Foresight is just one element in a broad spectrum of PPTs used to underpin German STI policies. A broad spectrum of innovation system analysis is available, with dedicated bodies advising the government on STI policy matters,¹⁹ and policy evaluations are conducted regularly. The extent, to which recommendations are followed, varies; in any case, German STI policy-makers have at their disposal a broad range of internal expertise, to interpret and learn from a *systematic and regular use of PPTs*.

The first phase of the BMBF Foresight (2007–2009) was closely connected to the High-Tech Strategy (HST), aimed at advancing the new approach to STI policies inherent to the HST. Against this backdrop, the BMBF Foresight pursued four main objectives:

- identify new focal areas in research and technology that the BMBF should address;

- define cross-cutting issues and interdisciplinary topics that require broader attention;
- help forge strategic partnerships of various departments within the ministry and different groups of RTDI actors in the innovation system, able to jointly address the areas and topics identified in a strategic manner;
- propose priorities for concrete measures to be adopted to promote the fields in question.

A combination of analytical and exploratory methods was applied, namely expert survey and participation, critical reflection and co-shaping of policy advice. A first, largely analytical phase delivered an overview of emerging future topics. It was consolidated by an on-line Delphi survey and followed by a series of workshops, designed to deliver the necessary 'sense-making'. Finally, 14 future RTDI topics and 7 cross-cutting future fields were identified, and suggestions were also made regarding actors to be involved, partnerships to be formed, and actions to be taken (Cuhls et al., 2009; Cuhls, 2010).

Close interaction between the BMBF and the project team was established in order to facilitate the refinement and integration of findings in the ministry's strategy and policies (Cuhls et al., 2008; Cuhls, 2013). While the future topics could be integrated comparatively easily in the thematic research strategies, this turned out to be more difficult for cross-cutting future fields, which were rather orthogonal to the organisational structure of the ministry. However, at least one new division was created in BMBF, focussing on cross-cutting issues (Demographic Change; Human-Technology Co-operation), while another one has attracted quite a lot of attention in policy debates (ProductionConsumption 2.0) (Cuhls 2013). Further impacts remain to be seen.

Overall, the BMBF Foresight can be regarded as enjoying quite *high visibility*, while at the same time being *embedded* in an advanced forward-looking and strategic culture in policy-making. It builds on a long-standing tradition of foresight activities using different approaches since the late 1970s, and – as a large-scale activity tied to the High-Tech Strategy – attracted a lot of interest from stakeholders. The *degree of participation was quite high*, even if more emphasis was put on expert stakeholders than, for instance, in the earlier FUTUR process, where broader engagement was intended and achieved. The on-line survey (with 2659 participants), the international advisory panel, and the range of sense-making and strategy workshops ensured a good embedding. Much emphasis was put on frequent interaction with policy-makers.

Returning to the expected impacts of BMBF Foresight, and the aim to support implementing the High-Tech Strategy, one can argue that policy-makers have indeed taken up several foresight recommendations, but the expected structural impact in terms of cross-cutting fields and approaches to STI policies has remained – thus far – limited. Addressing cross-cutting issues is difficult in an environment characterised by an antagonistic political-administrative culture, demarcated terrains of S&T fields, and a rather monolithic culture with limited openness to interdisciplinary approaches. However, there are some examples of interdisciplinary research that found a proper place in STI policies as dedicated organisational building blocks or major items in the political discourse. The ambitions have, thus far, only partly been met, but longer-term impacts cannot yet be assessed.

While the cross-cutting future fields may have encountered a limited success only, the overall impact of the BMBF Foresight was quite remarkable due to the uptake of results from the 14 RTDI topics. Overall, the 'embedding' of highly innovative cross-cutting future fields in a process that offers also a number of 'quick wins' for more traditional RTDI topics, actually may have been a wise approach. It allowed infusing some non-conventional insights, maybe even counter to the prevailing IPGS, in a context that was otherwise mainly receptive to conventional RTDI topics.

¹⁹ The Commission of Experts for Research and Innovation (EFI) is an important example.

The BMBF Foresight managed to avoid the fate of foresight projects in other countries (among which were e.g. Greece and Hungary) where changes in government significantly reduced the chances of foresight recommendations to be taken up by the new government. This is because the BMBF Foresight was not tied to any particular political goal; its results can be used for different kinds of strategy formation processes. By preparing emerging topics with a significant potential for exploitation, it still leaves enough room for political choices to be taken.²⁰

Dedicated efforts were made to interact closely with the sponsors of the BMBF Foresight. In fact, it was expected from the foresight team to engage intensely with different interested parties at BMBF. This interaction was a meandering in search and discovery of new topics, which – as a side effect – strengthened the interactions and debates within and across government departments.

While the immediate structural and organisational impact may thus have been limited, BMBF Foresight opened up several first niches for cross-cutting future fields. Others may not have been taken up prominently, but continue to be debated, as a reservoir for further systemic change. If the process is continued on a regular basis as planned, these niches and reservoir fields may get reinforced during the next cycle(s).

5. Conclusions

This article has proposed an analytical framework for exploring the potential impacts of FLAs that rests on different key features ('dimensions') of innovation governance sub-systems (IPGSs) and those of FLAs. The main purpose of this endeavour has been to explore which types of FLAs are compatible with which expression of the different IPGS dimensions. To reduce the complexity of this 'speculative' analysis, only those FLAs have been explored that aimed at inducing systemic changes. Such FLAs can be instrumental when – from a societal point of view – a radical change would be desirable, for instance to overcome a lock-in into traditional sectors, introduce a regime-shifting technology, or overhaul the IPGS itself (e.g. to change the STI policy rationale followed and/or the overall decision-making culture and methods used to underpin policy actions, improve the efficacy of STI policies and efficiency of public spending). Four different ideal types of 'systemic' FLAs have been identified, one of which has been characterised in an abstract way only, while the other three types have been examined in more detail by evaluating real-life FLA programmes. Even though the three cases considered may not perfectly fit the ideal types, they illustrate the usefulness of our proposed analytical framework for understanding the extent to which the 'match' between the FLA approach chosen and the key features of the IPGS has contributed to the intended changes in the respective NIS – or the 'mismatch', together with some other factors, has restricted the desired impacts.

This kind of analysis, when applied thoroughly and honestly, can deliver some well-substantiated hypotheses on the appropriateness of a chosen FLA approach, that is, a 'fit' between a particular FLA and the innovation policy governance sub-system. The main hypothesis put forward has been that the closer the fit, the stronger and more favourable impacts of FLAs can be expected (assuming an appropriate quality and methodological rigour in conducting the FLA project).

Obviously, no framework can ever guarantee that an actual FLA is going to have favourable impacts, even when it is theoretically sound, and thus compelling to STI policy-makers and FLA participants. Contextual factors and contingencies do matter for FLAs, too, and unexpected political or economic developments can override an appropriate, seemingly perfect FLA design.

²⁰ This reasoning does not suggest that other national foresight programmes have been tied to any particular political goal.

Ideally, an FLA should not be launched just because it is fashionable to do so – "our neighbours have done it, and we should be seen at least as advanced" – but to tackle a perceived policy need or seize new opportunities. In light of that, decision-makers, as well as FLA practitioners and analysts should keep in mind that policy needs, FLAs and IPGSs interact in several ways. First, an often neglected impact of FLAs is that the understanding of the originally targeted policy needs and options would need to be revised, and new ones are likely to be identified while conducting an FLA, which may, in turn, shift the character of a next FLA (assuming that the IPGS remains rather stable in the meantime). An obvious case in point would be the changing character of the UK foresight programme through its three cycles.²¹ Second, FLAs would impact on the innovation policy governance sub-system itself, at least in the longer term: a non-participatory FLA would reinforce the 'closeness' of an IPGS (its reliance on expert-based approaches), while a participatory FLA would open up a 'closed', hierarchical IPGS in a longer run, and with some ensuing tensions, of course. Finally, analysts and decision-makers also need to ask themselves a broader question when a lack of 'fit' between the above three elements is observed: is this a mistake in the design of an FLA, or has it been designed in this way on purpose, for instance with the intention to 'irritate' the prevailing system and by doing so induce systemic changes by that FLA?

These three considerations open up avenues for further research, but they can only be tackled in detail once a larger number of thorough evaluations of FLA experiences become available. The paper has focused on FLAs aimed at reshaping national innovations systems, but we believe that this framework can be extended to sectoral and regional innovation systems, too. Another possible extension would be to analyse FLAs aimed at setting thematic priorities (and thus directly or indirectly reinforcing the existing IPGS). This broadening of the scope of FLAs considered would allow drawing on a broader range of FLAs in future analyses. Clearly, the way ahead would be to formulate and analyse further specific hypotheses in addition to the ones explored in this paper; hypotheses that could subsequently evolve into guiding principles for the design of future FLAs.

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²¹ As thorough analyses of the UK foresight cycles are readily available (among others, Georghiou et al., 2010; Keenan and Miles, 2008; and Miles, 2005), here suffice it to recall briefly that the first cycle was aimed at identifying S&T priorities for the entire UK research system; the second was concerned with promoting a broader participation in dialogues on business-related issues via mobilising a wider variety of participants, and also broadening the issues considered, especially by putting more emphasis on quality of life; while the third significantly changed the scope of analyses to anticipate policy-relevant changes and identify how S&T can serve these direct, sharply focussed policy needs (e.g. tackle flooding, cyber crime and obesity), restricted the number of projects running at any one time (to three to four), as well as the time available to complete a given project (to 12–18 months).

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