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Networked Governance of Innovation Policies: the "Technological Plan" in Portugal

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Draft version– Comments are most welcome.

Abstract

The need for new more flexible forms of governance has been on the innovation political agenda for some time. However, policy makers are responding to the challenges of governing increasingly complex dynamic innovation systems and broader multi-sectoral domains of policy, with different approaches. This paper analyses how the coordination of a wider innovation policy agenda was recently dealt with in Portugal. We argue that the Technological Plan – PT 2005-2009, is an interesting case of Network Governance – NG that contrasts with closed corporatist structures, vertical path dependencies and cleavages that characterised Portuguese governance of innovation policies in the past. Although Network Governance is not a new phenomenon, there is no comprehensive study to help explaining under what conditions can NG be a solution to the need to have more flexible forms of innovation policy governance. Our main focus is to see the effects of such new networked coordination in terms of better articulation, control of implementation and monitoring of progress towards pre-defined objectives, over a wider innovation agenda.

1. Introduction

In its Action Plan for Innovation, the European Commission (European Commission, 2004) called the attention of Member States to the need to improve innovation governance mechanisms, in order to foster a more efficient policy coordination, stakeholder involvement and to activate the public sector as an innovation driver.

While there is an increased awareness of the failure of traditional innovation governance mechanisms together with greater demand for relevance and accountability (Braun and Merrien, 1999), there is also a progressive widening of the scope of innovation policies (Borrás, 2009). Innovation policies are becoming more complex, addressing not only the core science, technology and innovation policies, but also other policy domains such as education, health, agriculture, ICT and so on. A wider perspective of innovation policies also means that interactions between policy fields, possibly influencing the outcomes of each other, may become a key aspect of governance. For governance this means that departmentalization and horizontal governance, have probably gained more importance. Also, ensuring stakeholders and society involvement at large in design and implementation of innovation policies despite multi-layering of governance is also gaining renewed importance. As a result the effectiveness of this broader view of innovation policies may increasingly rely, not so much on the contents of the policies, but more so on how different policies in different fields are coordinated. Hence, new and more flexible forms of governance seem to be emerging in different European countries.

In some cases attention is paid to joined-up government initiatives and other forms of coordination mechanisms such as multi-sectoral budgeting, ad-hoc and (bottom-up) programmatic co-ordination, inter-ministerial bodies (liaison agencies or foundations for example) (Boekholt and Arnold, 2002). There are also attempts to use Network Governance enabling the coordination of wider domains of policy into the umbrella of innovation but without loosing flexibility. Some countries such as Finland, Sweden and Netherlands, are developing National Innovation Councils (Edler *et al*, 2003; Perkonen, 2006). These very high level councils provide not only strategic intelligence but attempt to break with the traditional departmentalization and ministerial silos. Also because articulation of policies at the design stage is different from articulation of the implementation stage, high level councils and other responses, such as network governance, are supposed to provide better vertical integration and promote inclusion of end-user and stakeholders in the policy process. The central point being that the governance of such a systemic, horizontal and increasingly complex process such as innovation, increasingly demands keeping citizens and civil society “involved” not just “informed”.

Although the need for new more flexible forms of governance has been on the political agenda of policy makers for same time, it has not been at the forefront of innovation policy analysis. We need to know how the governance structure deal with adaptation and change in the innovation system. How different countries respond to the challenges of governing increasingly complex dynamic innovation systems and articulate broader, horizontal and multi-sectoral domains of policy (e.g. primary and secondary education, information society, health) increasingly associated to innovation policy design and implementation. In particular and although *Network Governance* - NG is

not a new phenomenon, there is no comprehensive theory to help explaining under what conditions can NG be a solution to the need to have more flexible forms of innovation policy governance.

This paper analyses how the requirements for a wider and integrated innovation policy are recently dealt in Portugal, by examining the *Technological Plan* – TP. The launch of the Technological Plan in 2005 (a broad Innovation Policy agenda involving research, education, information society and modernization of public administration) in the frame of the Lisbon Strategy, led to the creation of a new coordination cabinet (GCNELPT) responding directly to the Prime Minister. This new Cabinet is an example of a network governance response. It created an Advisory Council in order to obtain higher participation from enterprises and other sectors of society. To support the cabinet mission, "focal points" as direct representatives of every Minister were appointed in what became known as the "network of focal points" for the Technological Plan. This new network governance structure comes at a time when a wider approach to innovation policies is also attempted in Portugal. Also, this new NG contrasts with the closed corporatist structures, vertical path dependencies and cleavages in the innovation governance that explains the historical departmentalization and separation between Research Policy and Innovation Policy that has been common practice for many years in Portugal (Laranja, 2007).

Using GCNELPT's networking activities as a case study, the objective of this paper is to contribute to a realistic assessment of the conditions under which small cabinets providing articulation and coordination of innovation policies and policy-instruments can provide value added by improving overall multi-sectoral governance. Our main focus is to see the effects of such new networked coordination in terms of better articulation, control of implementation and monitoring of progress towards pre-defined objectives, over a wider innovation agenda.

2. Conceptual background

2.1 Defining governance of innovation policy

The term "governance" has been extensively used in the Public Management literature together with concerns with efficiency, accountability, flexibility, responsiveness and even reflexivity in public administration and in policy design and implementation. The use of the term "governance" in the innovation policy arena is, however, much more recent (Boekholt and Arnold, 2002) and comprehends a complex interplay of various actors of the "innovation system". According to John de la Mothe (2001, p.3) "…governance is about the handling of complexity and the management of dynamic flows. It is fundamentally about interdependence, linkages, networks, partnerships, co-evolution and mutual adjustment." Boekholt (2004, p.5) sees governance of innovation policy as *a process* by which "priorities are set in the system, how stakeholders have an impact on this, and how policy learning takes place (through formal routes such as policy planning tools, monitoring and evaluation, or more informal channels such as learning-by-doing)."

The outcomes of such a process for governing innovation policy are not just consensus, nor just the definition of how much to invest in R&D and innovation (and in what fields) and what institutional mechanisms or specific instruments, such as individual or consortia grants, need to be developed. Governance also increasingly includes policy learning, on-going monitoring and evaluative practices associated with policy measures' implementation and often supported by different types of indicators (result and impact indicators, for example).

Governance innovation policy involves specific tasks (Boekholt and Arnold, 2002). For example it involves an on-going process of subjective reading of global changes in society, markets, science and technology in order to arrive at a coherent vision about future trends. Often this is considered as a process of strategic intelligence (Kuhlmann *et al*, 1999), producing strategic options. But governance of innovation policy also involves analysis of barriers to progress or dysfunctions of the innovation system. Finally, governance of innovation policies involves steering and representing the interests of different actors at different levels and from different policy domains in order to set and achieve consensus and common objectives.

2.2 The changing governance of innovation policy. Trends and challenges

Country studies such as Edler *et al* (2003) or OECD (2005), suggest a need for adaptive and flexible approaches to innovation policy. Governance of innovation policy therefore, faces a number of common challenges such as better coordination at different levels and spanning a wider range of different policy areas.

A major first challenge is the need for greater inter-disciplinary interaction in the knowledge creation function of innovation systems. Tackling multidisciplinary science appears to be more difficult within existing governance structures, apparently geared towards Mode I *i.e.* geared towards generation of knowledge within single disciplines in a context governed by the, largely academic, interests of a specific community. The growing recognition of the importance of Mode II favouring transdicisplinarity knowledge, produced in the context of application, heterogeneity, organizational diversity and reflexivity (Gibbons *et al*, 1994), demands more flexible governance structures. However, while in many countries it is common to find dedicated task forces for analysis and design of policies for transdicisplinary, in areas such as nanotechnology or genomics, among others, this may not be sufficient to foster joint action and counteract path dependency and the institutional segmentation inherited from Mode I.

On the other hand the "knowledge transfer" function *i.e.* the commercial exploitation of knowledge also demands better articulation of science policy with innovation policy. Perhaps one of the oldest challenges in governance of innovation policies is to break with the historical departmentalisation of innovation-related policy arenas (Boekolt,

2004). For example, the divide between research policy favouring scientific excellence and policies for innovation in enterprises has been a common practice in many countries [1].

Because modern economical and societal issues, in particular those related to the knowledge and innovation economy are too large to be addressed from one sectoral policy perspective only, innovation policy today is both widening and deepening (Borrás, 2009). For example, policy domains such as health, energy, environment, transport, ICT, etc., not only require and stimulate innovations but also affect the wellbeing of citizens and thus indirectly competitiveness. There are more policy areas directly involved in the so called "3rd generation innovation policies" (European Commission, 2002) and at the same time governments are using deeper and more sophisticated instruments of policy intervention. However, the common practice in many European countries is that each of these domains has separate innovation policies, formulated and implemented by their respective sectoral departments, in many cases increasingly claiming for greater participation in the overall innovation policy process.

This means that today departmentalisation is wider than the 'classic' gap between research and innovation policies and that bridging across policy silos is more complex. As pointed out by Edler *et al* (2003), the new challenge for governance is to set a horizontally coordinated innovation policy conceptualised as systemic or bridging policy.

Another major challenge for innovation policy governance is "user activism" i.e. need for more active participation of end users and beneficiaries of specific policies and instruments. From the perspective of the end user a large diversity of policies hinders transparency. Also because the end user evolves along quite specific historical trajectories, usually nested around problem perceptions that can not be easily foreseen or captured by those that traditionally participate in policy design and implementation, there is an advantage in involving the target sectors envisioned by the different policy instruments in the governance process. However, involving end users in the vertical governance process is only one important aspect of the wider challenge of multi-level governance. Recently policy governance processes are being shifted upwards to supra-national (European) bodies and downwards to sub-national (regional) authorities (Koschatzky, 2000). The fact is that for many of the current global societal challenges, the nation state alone may to be too small to respond to specific knowledge accumulations that underline rapid technological change (Bache, 2004; Lyall, 2007; Keating, 1998) and yet too large to attend specific needs of the regions. The challenge is to reinforce decentralization and participation in formulation, decision making and implementation of innovation policies of a wider variety of (regional) intermediate agencies, both private and public, at multiple layers (Lajendijk and Cornford, 2000; Kuhlmann *et al*, 1999), but still manage to improve coherence,

[1] Research policy is constructed through quite a specific set of departmentalised institutions like Universities, Public Research Establishments – PREs and private Laboratories, each with different interests, value-orientations and incentives. Over the years these related actor groups have established a specific, rather closed policy arena and learned to arrange their cooperation and competition games vis-à-vis public policies. On the other hand, policies for business innovation are constructed and implemented through ministries in charge of economic affairs and their associated institutes, with varying degrees of participation from enterprises or their representatives (enterprise associations).

effectiveness and integration. Countries such as UK and Sweden for example have recently taken this challenge one step further and have issued formal performance contracts between national and regional agencies.

A similar challenge for governance of innovation policies that is somehow related to multi-layering of policies is the relative de-integration of policy conception from actual implementation. That is the relative disconnection of strategic conception of policies from implementation management of programmes and measures for action. Often the processes of policy formulation are confined to ministerial departments and cabinets, perhaps advised by a growing industry of specialized innovation policy consultants, but do not benefit from inputs received from intermediaries in the innovation system such as agencies, foundations, institutes, etc., who may be more knowledgeable of how particular instruments may or may not be able to contribute to policy objectives. In fact, while the theory-policy link has been somehow present in the development of policy, learning from implementation feedbacks is relatively less common (Mytelka and Smith, 2002). On the other hand, decoupling is also a result from capture of principal-agent systems by client communities (Braun, 1993). That is, policy implementation may become locked-in, appropriated by intermediaries or other stakeholders, which in turn conduces to greater de-integration between design and implementation. The strengths of this middle level in the overall processes of policy design and implementation may, however, vary considerably. While Ireland for instance, has a relatively thin Ministerial level and a strong position for its agency Enterprise Ireland, the Netherlands has a strong Ministry of Economic Affairs and a less independent position of its agency SENTER (Boekholt and Arnold, 2002). In Portugal intermediate technocratic bureaus for management of Community Structural Funds - CSFs have, by in large, appropriated the implementation processes and manage to maintain instruments and practices practically unchanged, regardless of any strategic changes in the innovation policy agenda at a higher level (Laranja, 2007).

Accountability and evaluation, are also emerging as more important challenges for governance of innovation policies (Georghiou, 1995; Georghiou and Laredo, 2006). An increasing number of actors outside and inside the innovation system (parliaments, government auditors, business associations, political parties) increasingly demand evidence of the effectiveness of innovation policies (Boekholt, 2004). In particular, in the relationship between intermediaries whith the responsibility for allocating funding and those who perform R&D and innovation (universities, research organisations and laboratories, firms), accountability is expected from both funders and performers. For example when considering grants or subsidies to investment in R&D and Innovation, the distribution and management of public funds requires clear *ex-ante* evaluation criteria and transparency. But the good or bad use of public funds requires *ex-post* evaluation criteria to demonstrate whether increases in performance were in fact achieved. Moreover, the time lag between distribution of funding and the production of results may blur accountability even further. Recent emphasis on on-going policy monitoring and evaluation of programmes and policies, as aids to policy decision making is not only a result of these greater concerns with accountability, but also a consequence of the increasing influence New Public Management in the domain of innovation policy. As seen in the previous issue, accountability is also affected by the relative de-integration of policy design from policy conception and level of

independence of the "middle layer" (e.g. sectoral research councils, funding institutes, dedicated agencies, etc.) and its capacity to appropriate the process of policy implementation.

Finally, another key challenge for better governance of innovation policies is how reflexivity and 'strategic intelligence' is organized and how it feeds the processes of policy design and implementation. While some countries use intermediary institutions or in some cases inter-ministerial committees, others use more or less specialised Advisory Bodies to identify and reflect about general broad societal, scientific and technological trends. The status, the level at which they are positioned and the composition and linkages with key decision makers is another important governance issue which shows wide variations across countries. In Europe there are several cases of countries using a very high level Council to discuss the overall strategy and to act as 'referee' in the system. The European Commission (2004) also recommends to member states the creation of such "National Innovation Councils". Finland, for example was one of the first countries to create a National Innovation Council to assist the Finnish Government. According to Perkonen (2007), this Council is charged with directing national policy and producing policy review report every three years. The Council is headed by the Prime Minister and its membership comprises a maximum of seven other ministers, as well as up to ten other members representing key actors and stakeholders of the innovation system. A key aspect of these very high level councils is the degree to which the national governments (Cabinet and Prime Minister) are involved in deciding and on overall co-ordination and strategy formulation.

2.3 Network Governance

Governance of innovation policies is therefore facing new challenges and governments are looking into new approaches that can improve effectiveness and overall performance of innovation systems. While the use of high level councils for overall strategic analysis and monitoring of innovation policies is one response, Network Governance – NG may provide an alternative solution to improve innovation governance. Although NG is not a new phenomenon, there is no comprehensive theory to help explaining under what conditions NG offers comparative advantage. Management scholars refer to NG when coordination is characterized by informal or semi-formal social systems rather than by hierarchical structures and formal contractual relationships (Jones *et al*, 1997). For example, in industrial clusters such as semiconductors, biotechnology, film, music, fashion or Italian textiles, the emergence of network governance is seen as a key factor explaining the successful development of complex products under uncertain competitive environments.

In the domain of political science, network governance concepts emerged in association with concerns about failure of traditional governing mechanisms (Berner *et al*, 2004; Kersbergen and Waarden, 2004). For this literature, networked forms of governance are organisational arrangements mixing public and private resources, and reflect a response to an increasingly complex interdependence of different policy sectors or domains. NG does not intent to

replace traditional governance mechanisms, but rather to co-evolve with them, complementing or supplementing, adding value by helping to coordinate, articulate and positively influence different policy domains.

Over the past decade or so NG became a common approach for governing international networks with a global scope, linking multiple policy domains at different levels, and can be identified in a wide variety of domains ranging from humanitarian, anticorruption, climate change and environment, health, digital inclusion and labour standards, among others.

One of the advantages of NG is that it enables articulation and pooling of public and private resources by establishing relationships that help to improve overall problem analysis and solving capacity, while at the same time increasing societal participation. Networked forms of organization may therefore be more open and flexible and they can not only operate top down (as in a vertical hierarchy), but may also allow bottom-up and horizontal processes of coordination by mutual adjustment, rather than by command and control.

Network governance is not however a panacea for all policy problems and in particular for innovation policy governance problems. A weak point of network governance is that it is often regarded as relatively less efficient, unrepresentative, having poor political legitimacy and little or no direct intervention capacity (Berner *et al*, 2004). Also NG usually faces the well known problem of 'collective accountability' - the politics of 'blame avoidance'.

Making information available on websites, intranets, etc. may also be an important element of network governance. Gathering and making information available about overall policy strategy and monitoring, facilitates learning across policy domains and may enhance mutual adjustment by consensus[2].

3. The governance of Innovation Policies in Portugal

In 1986 OECD experts examining Portuguese Policies for Science and Technology were asking "Why does the history of science and technology in Portugal give the impression of an unfinished symphony?" (OECD 1986, p.90). In fact over the last 30 years or so, the Portuguese Innovation system grew substantially. For example whereas in 1981 GERD – Gross Expenditure in R&D was only 0,31% of GDP, in 2008 GERD amounted to 1,51% of GDP. However, despite this slow but steady increase it was not until 2007 that the contribution of the enterprise sector for total R&D expenditures surpassed that of all other sectors.

Steady growth and the more recent changes in structure did not follow, however, from any significant change in policy or in governance. Before the Technological Plan (analyzed in more detailed in the next section) and despite

[2] Internet 2.0 with its virtual social networks, wikis, twitter etc., provides new powerful tools that may support bridging stakeholders interests and policy domains, hence enhancing network governance.

increasing complexity at the middle intermediate levels, the governance of Portuguese Innovation Policy did not changed significantly. We may identify three stages in the evolution of the Portuguese governance of innovation policies (Caraça, 1999; Laranja, 2007).

-- Figures 1, 2 and 3 about here --

At the first state, starting in the late 1960s up to the middle 1980s, just before Portugal joining the EC, innovation policies were essentially research policies and were taken as an enclave of more general economic and social development policies. At the time, the *Junta* - JNICT - *Junta Nacional de Investigação Científica e Tecnológica* created in 1967 to articulate sectoral policies for R&D, was focused on gathering R&D statistics for the OECD, promoting international funding and managing the public R&D account by centralizing budget planning of all public expenditure in Science and Technology.

Moreover, recognizing that public R&D was dispersed through different directorates, Portuguese Governments in the late 70s and early 1980s decided to create the so called *Laboratórios do Estado* – large PREs- *Public Research Establishments*, attached to different Ministries and organised by sectors such as agriculture, fishery, industry, construction, health, or by science and technology fields such as geophysics, geology, hydrography [3]. While in most countries of northern Europe, PREs were set up in the early 1930s (and in some cases even before), oriented towards scientific missions in areas such as civil nuclear technology, aerospace, health, construction, telecommunications, in Portugal they were created much later and their mission was associated with ensuring national scientific independence relatively to more advanced countries.

It was also in the late 70s that the Higher Education sector [4] was struggling to define its own autonomous science policies and programmes. At the time university based research centers depended from a double hierarchy. On the one hand, they responded to scientific and educational programmes set by the Scientific Councils of their own universities. On the other hand, through INIC - *Instituto Nacional de Investigação Científica,* they were pressured to meet a different set of priorities, if they whished to find funding for their R&D projects (OCDE 1986, p.52).

This dual public R&D system, re-constructed after the revolution in 1974, favoured a vertical governance structure with two strong poles: PREs attached to different Ministries one the one hand and universities attached to INIC, on

[3] In the 1980s there were 9 main large PREs in Portugal: LNETI – *National Laboratory of Engineering and Industrial Technology*; INIA – the *National Institute for Agriculture Research*; LNIV – *National Laboratory for Veterinary*; INIP – the *National Institute for Fishery Research*; LNEC the *National Laboratory for Civil Engineering* founded in 1946; INS – *National Health Institute*; INIC – *National Institute for Scientific Research* (at the Universities); IICT – *Institute for Tropical Research*; IH – *Institute for Hydrography.*

[4] At the time R&D in the Higher Education Sector was coordinated by INIC - *Instituto Nacional de Investigação Científica.*

the other hand [5]. During this first stage JNICT was never really given the chance to counteract verticalization and articulate sectoral science policies (Ruivo, 1998; OECD, 1986). In general, at that time, Ministries felt that they had little or no obligation to abdicate of their own science and technology resources and therefore research policy was not seen as an issue that required inter-ministerial coordination. The first stage can therefore be characterized by problems of legitimacy at JNICT; a vertical dual governance structure, an absence of shared vision for long term planning and; little or attention to innovation in enterprises.

The second stage starts in the middle 80s when Portugal joined the European Union. With access to Structural and Cohesion funds that could be use for science and technology, innovation policy becomes divided into to two separate arenas. On the one hand, the expansion of the research system centered around the constituencies of PREs and the Higher Education Sector, by investing strongly new infrastructures and raising the number of qualified scientists. On the other hand, the Ministry in charge of economic policy initiates at this stage, an innovation policy centered around the support to SMEs, through the development of a national network of small technology centers in different sectors.

Overall, this led to a rapid expansion of the system in terms of number of science and technology infrastructures (new technology institutes, technology centers, business innovation centers, science and technology parks, etc.) for science, qualified human resources and for incubation of innovative businesses, but it did not help to build the necessary linkages between research and innovation that are necessary to form a "system" of innovation.

The availability of Cohesion and Structural funds for Science and Innovation policies triggered not only the creation of more infrastructure but also the creation a new breed of intermediary technocratic bureaus charged with management of a more comprehensive portfolio of instruments, action measures and programmes. Over time, this intermediate layer (the grey area in figure 2) would appropriate much of the design and implementation processes associated with innovation policies.
At the Ministerial level, however, the bipolarization was not between PREs and Higher Education as at the previous stage but the classic bipolaration between research policy (at the Ministry of Science and Technology) and the innovation component of economic policy (at the Ministry of Economy). At this stage the innovation component of economic and industrial policy favoured the neoclassic market failure rational and while the competitiveness rhetoric emphasized the importance of intangible factors (such as design and innovation), policy instruments focused on investment in embodied technology (machinery, tools, computers, etc.).

In the 1980s, given the relatively lower levels of human and infrastructure resources it made sense to use Cohesion and Structural funds for a rapid "catching up" strategy even if centered around public infrastructures and polarized around two different arenas. However, by the end of the 1990s, given a much wider institutional diversity and the

[5] João Caraça (1999) rightly points out that, in the long run, the Higher Education Sector would become a winner in this struggle for power as it had the capability to generate and capture human and financial resources to scientific research.

substantially higher levels of resources, it begun to make more sense to gear towards systemic and integrated policies that would need a new approach to governance.

Finally, in the late 1990s, we can identify the beginning of a third stage. The first signs of change appear in the national strategic reference document PNDES in 1998. In this document innovation policy appears for the first time as a national priority above economic, science or any other sectoral policies. In 2001 the PROINOV initiative, conducted centrally by the Presidency of the Council of Ministers, was a first attempt to surmount a transversal coordination function across a wider set policy areas covering science, education, information society and innovation. However, with the coming of new government PROINOV came to an end shortly after its launch without having time to demonstrate the benefits of such programmatic articulation. The new government, however, centralized innovation policies in a new deputy Minister to the Prime Minister, hence attempting to further institutionalize sectoral policies for innovation.

Hence, it was only in 2001 that innovation policy in Portugal began to be taken as an umbrella for sectoral policies. Despite the above changes in governance, however, by and large, sectoral policies continued to be poorly articulated and remained relatively isolated.

Overall across these three stages, and despite strong growth in size and changes in the system structure, innovation policy remained in essence a compartmentalized multi-sectoral policy, often lacking coherence and articulation, perhaps best described as a set of policy silos, relatively isolated from each other (Laranja, 2007). Something that the OECD examiners had already indentified earlier in the middle 80s, when they called attention to Portuguese authorities to the fact that the first country that exports cork had only one researcher actively working in research useful for that sector (OECD, 1986).

4. The Technological Plan: A case study on a National Innovation Plan with network governance

Some of the challenges and issues of innovation policy governance, elaborated in the previous sections can be illustrated by the particular example of the Technology Plan in Portugal. In our view a fourth stage in the development of governance of innovation policies in Portugal can be identified with the *Technological Plan* – TP from 2005 to 2009. During the 2005 election campaign, the slogan that the country would need a "technological shock" to accelerate modernization, originated the so called *Technological Plan,* defined as a "policy agenda for mobilization that envisions to promote a decentralised but articulated implementation of a wide set of measures for science, technology and innovation" (PT, 2005). Essentially, the *Technological Plan* is a partnership between government and society, that envisions not only articulation of multi-sectoral policies but also combine and leverage public measures for action with bottom-up initiatives and projects promoted by the private sector, groups of interest and society at large.

The *TP* started with 78 policy measures but over the years the number of measures that it tried to combine and articulate grew to 163 (in November 2008). These are measures that cover a wide scope of policy domains ranging from education at all levels (primary, secondary and higher education), long life learning, information society, technological modernization of public administration (often known as e-Gov), technological modernization in the health sector, scientific research, and innovation in the enterprise sector. The design of these measures was, however, undertaken by each policy sector in isolation of the others and with little or no input from end users and target beneficiaries.

Although the *TP* can not be taken as a truly integrated policy for innovation across domains, but rather as a joined-up initiative, for the context of Portuguese governance of innovation policy, as briefly described in the previous section, coordination of such a wide scope of policy measures breaked with the traditional multi-sectoral approach. Bridging measures such as the launch of Technology and Competitiveness Poles[6], forcing the Ministries of Economy, Science and Territorial Planning to collaborate also helped to introduce horizontal coordination, avoiding duplication o efforts and explicitly inviting the emergence of integrated measures.

A special cabinet named CNELPT, attached to the Prime Ministers' office was created to coordinate the *TP* [7]. This high level coordination cabinet can be taken as a clear attempt to implement a networked form of governance of innovation policy. The coordination activities of the cabinet included several mechanisms:

(a) A network of 20 "focal points" consisting of advisors working at each Ministry's cabinet across all sectors of government and a few other organisations such as the Observatory of Structural Funds. Each of these focal points became responsible at each Ministry for gathering information an report to the central coordination unit CNELPT about implementation of measures of that Ministry that fell under the scope of the Technology Plan. The network of focal points met at least twice a year with the Coordinator of the Technological Plan. The meetings served to discuss progress and suggestions for further improvements, as well as proposals for new measures. Bilateral meetings between the cabinet's staff and Ministry's focal points and managers of each measure were also frequent and served to feed information in the monitoring and control process and to mediate particular needs of inter-ministerial interaction.

[6] The Pólos de Competitividade e Tecnologia (Competitiveness and Technology Poles – CTP) is an inter-ministerial measure involving the Ministry of Economy and the Ministry of Science and Higher Education. Regional Coordination Committees (regional authorities) are also involved for the case of smaller clusters. The rationale is to use ERDF funds to support R&D, innovation and internationalization projects, possibly involving training, proposed by large consortia of actors and envisioning long term collective development strategies.

[7] In fact, CNELPT – *Gabinete de Coordenação da Estratégia de Lisboa e do Plano Tecnológico*, was created for the coordination of the Portuguese National Reform Programme under the Lisbon Strategy. However, shortly after the launch of the TP by the Ministry of the Economy, the coordination of the TP was transferred to this higher level cabinet attached to the Prime's Minister Office.

(b) Another important governing mechanism was the development of indicator-driven targets as an aid to strategic monitoring of policy. Beyond progress and result indicators usually defined at the level of each measure, the *TP* also defined impact indicators at a more aggregate level and introduced the use of international thematic rankings for benchmarking performance (e.g. European Innovation Scoreboard). Moreover, for progress monitoring the *TP* developed a collaborative platform (intranet) whereby focal points, working closely with managers of each measure at their ministries, can update information relating to progress in implementation and results achieved.

(c) Another important component of this networked governance was the creation of an Advisory Council. The *TP* Advisory Council had 39 counsellors. It is interesting to note that 8 members of the council came from universities, 26 came from enterprises chosen amongst those with higher R&D expenditures, and 5 came from industrial associations, foundations and others. The Advisory Council met twice a year and produced recommendations and suggestions to the reporting produced by the coordination cabinet of the *TP*. Note however that this Council has an advisory role and therefore does not have the same high level political legitimacy as compared to National Innovation Councils implemented in other countries of Europe. Nevertheless, it represents in Portugal a new direct linkage with important stakeholders of the innovation system.

(d) To further extent the technological plan making it more inclusive, members of the cabinet extensively participated in workshops, conferences, seminars, meetings, etc. This enabled to identify projects and initiatives that could complement or supplement the *TP* agenda. Over time demand for meetings at the cabinet for mediating public-private partnerships proposing innovative projects in multiple domains, to be included in the *TP* portfolio, grew steady. Figure 4 illustrates how network governance was implemented at the Technological Plan.

Figure 4 about here

5. Discussion

In this paper we attempted to explore the potential advantages offered by networked schemes of governance in order to respond to the requirements for a wider and more articulated innovation policy. Our analysis, based on the experience of the *Technological Plan* 2005-2009 in Portugal, raises a number of interesting issues for discussion.

First the advantages of NG in contributing to break with the traditional vertical cleavages are clear in the case of the Portuguese *TP*. Although tensions and claims between research policy and innovation policy still remain, the supra coordination and the wider scope of the *TP*, adding other policy domains, mitigated this classical gap. The extent to which this new governance network is able to foster a more effective "transfer of knowledge" to commercialization is still unclear and in fact, the *TP* portfolio was very much designed and implemented vertically. The supra coordination of a network of focal points involving all the Ministries is therefore, essentially, a follow-up and

monitoring of joined-up measures and initiatives. However, the launching of bridging measures such as the Technology and Competitiveness Poles wouldn't have been possible without the mediating efforts of the *Technological Plan*. Nevertheless, the openness and flexibility of NG at the TP that enables to counteract departmentalization was not, however, explicitly used to tackle the more complex multidisciplinary issues raised by Mode II.

Second, for the case of the TP in Portugal the openness of the NG allowed a more frequent direct contact with policy targets (public research establishments, firms, groups of interest, etc.) and helped to promote a wider consensus about the importance of technology and innovation. Where NG was perhaps less successful is that these targeted groups of interest were still left outside the cycle of policy design. Intermediate technocratic bureaus in charge of managing structural funds, that by and large are the main source of funding for implementation of innovation support measures, are often the strongest influence in the design of specific instruments, despite little alignment of such instruments with overall innovation policy. The contribution of NG to counteract decoupling of policy design (overall strategy) from policy instrumentation and implementation (feedback) was therefore less effective than one could expect.

Third, the introduction by the *TP* of an on-going formal monitoring system associated with indicador-driven targets, was a most welcome attempt to increase accountability, in line with practices of New Public Management. However, the previous weak point in terms of joined-up government, was now an advantage in terms of clear accountability. In the *TP* case study the general problems of devising systems of 'collective accountability' in network governance were relatively minor. Because of the much higher visibility of the *Technology Plan* as whole in the media, when compared with most vertical measures in its portfolio, accountability was clearly associated to the *TP* rather than to individual measures or to their respective Ministries. A interesting result from the use of indicator-driven targets and impacts, as central to accountability, is that it triggered a much needed debate (particularly in the advisory council, but also in the media more generally) on how to interpret the evolution of such indicators and in particular the direct association between impacts of a more long term nature and intended short term effects of specific measures of the *TP*.

Fourth, the much needed function of strategic intelligence in any innovation system has not, in this case, been significantly improved with the use of such networked form of governance. Although both the network of focal points and the advisory council provided valuable suggestions, there was no formal foresight process, where the participants could develop consensus on research and innovation priorities and create a shared vision of the future they would like to achieve. Such a process would be concerned with constructing a desirable but achievable long term vision for the country and with identifying the critical strategic decisions that must be taken to make the achievement of the vision more probable. Ultimately, such a process is needed to help creating a change in mindsets regarding the way a country approaches the future.

Finally, to summarize, the approach to a widening multi-sectoral innovation policy co-ordination, through the NG of the *Technological Plan* 2005-2009 in Portugal has essentially been a semi-formal system of coordination of "focal points" for related measures in different policy domains, complemented by a rather more formal system for policy monitoring associated with indicator-driven targets, impacts and country-rankings. In essence the NG of the TP attempted to change a multi-domain policy portfolio created by the summation of discrete policies and instruments into a dynamic, interacting policy mix agenda for innovation. This was a most welcome step forward as a new coordination mechanism within the innovation policy system, and it seemed to be successful at counteracting traditional policy silos. As an interesting side effect of the *TP*, there are now higher sectoral claims for greater participation in overall process of innovation policy design and implementation which poses even greater challenges for future governance.

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Figure 1 - Governance of Innovation policies in Portugal. 1st stage - late 60s to middle 80s

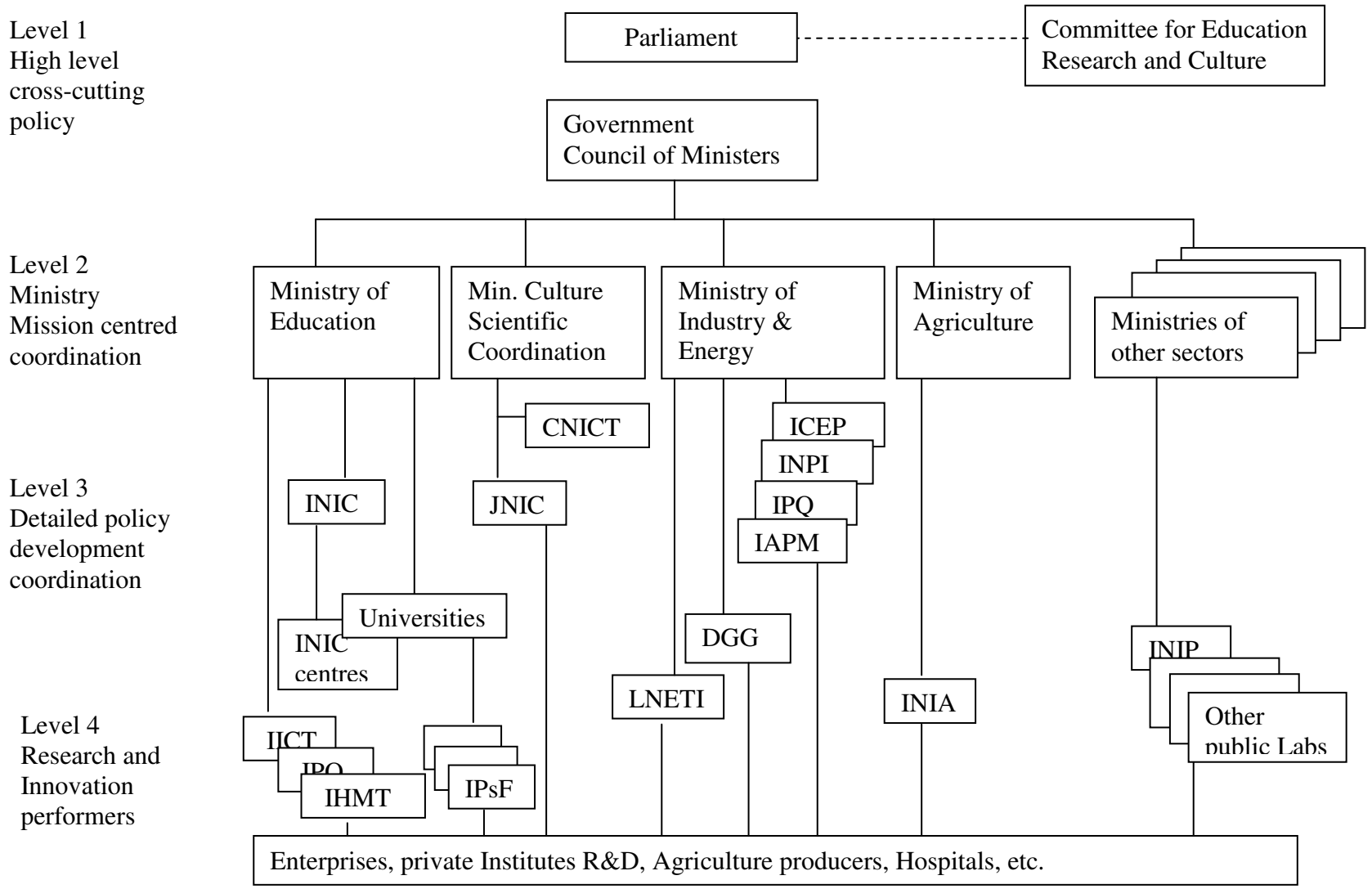

Figure 2. Governance of Innovation policies in Portugal**.** 2nd Stage – 1995 the creation of the Ministry of Science

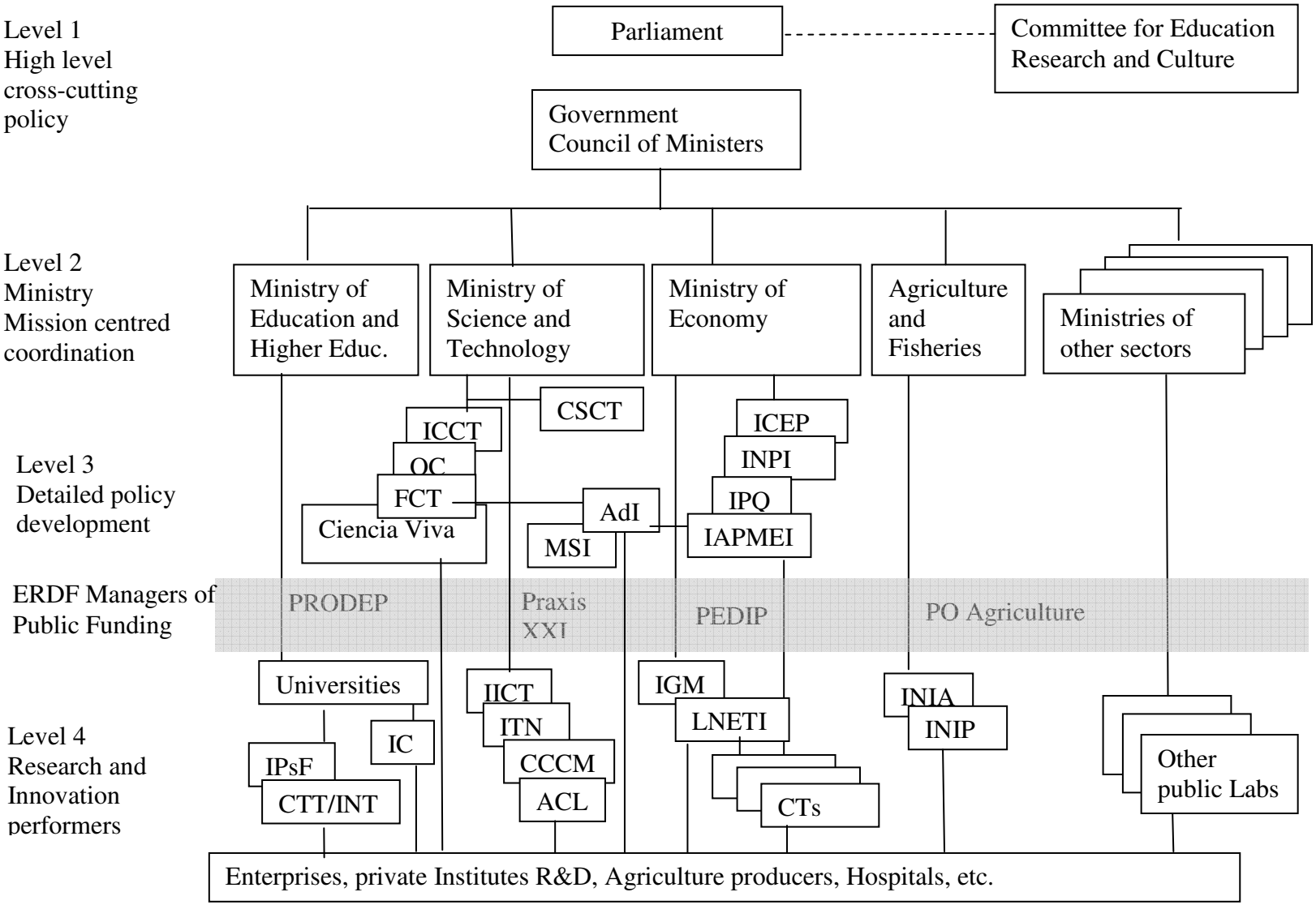

Figure 3. Governance of Innovation policies in Portugal**.** 3rd Stage – First attempt to see innovation policy as an umbrella policy

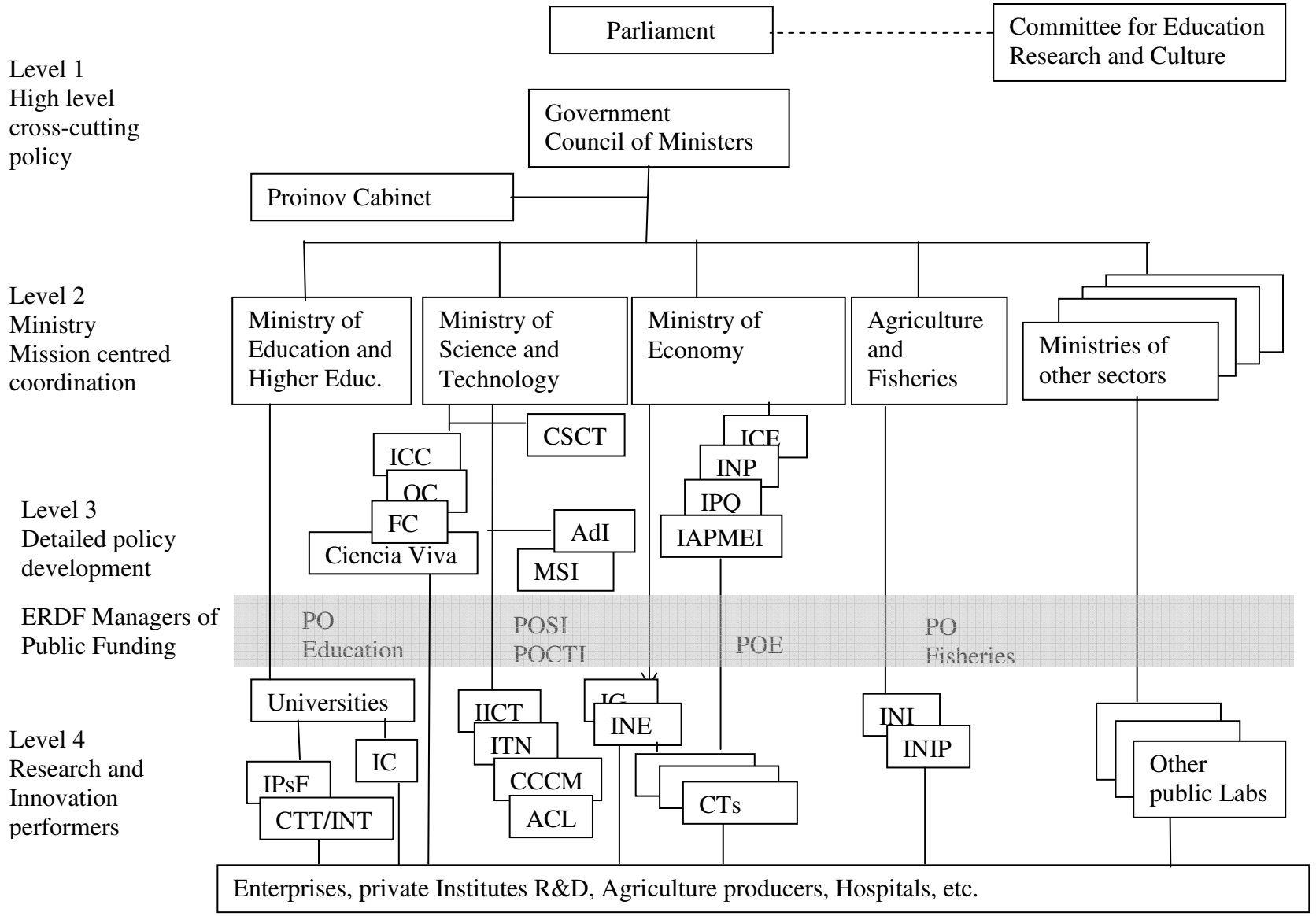

Figure 4 Activities that enabled a more networked form of governance of innovation policies