

# Networked Governance of Innovation Policies: the “Technological Plan” in Portugal

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## Abstract

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 and 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, 2008). 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 losing 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 some 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.

## 1. Conceptual background

### 1.1 Defining governance of innovation policy

According to Boekholt and Arnold (2002), the concept of governance has only recently emerged in the innovation policy debate. In the context of innovation policies, the governance process includes the complex interplay of various actors of the “innovation system”. John de la Mothe (2001, p.3) emphasises the importance of such inter-institutional linkages and according to his definition “...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) on the other hand, also proposed a definition of 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).”

Thus the outcomes of the governance process of 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. It also increasingly includes policy learning through monitoring and an on-going evaluative practice associated with implementation, rather than with design, and supported by different types of indicators (macro, result and impact indicators, for example).

The process of governing 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) (at a particular scale region, nation-state, supra-national), producing strategic options. The core activity of innovation governance is the coordination of the production and application of scientific and technological knowledge with economic and social benefits. 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.

### 1.2 The changing governance of innovation policy. Trends and challenges

As briefly referred in the abstract, better coordination and a systemic integration of the processes of formulation and implementation of innovation policies at different levels, has been identified as a key issue in governance of innovation policies. From the responses attempted in countries such as Finland, Ireland, Norway, Denmark, Netherlands and others (Edler *et al.*, 2003), it is possible to identify a number of common challenges to a more effective governance of innovation policies.

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 transdisciplinary 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 transdisciplinary, 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 “transfer” of knowledge *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 (Boekholt, 2004). For example the divide between research policy favouring scientific and research excellence and policies for innovation in enterprises, has been a common problem in many countries. 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). Integrating research policy with business innovation policies, involves a difficult conciliation between the perspective of “scientificism” (*i.e.* that science would always lead to social benefits, as in Vannevar Bush, 1945) and the perspective of “economicism” (or short-termism), about the development of innovation in business only responding to market trends with little or no technology-push.

Because modern societal issues are too big to address from one sectoral policy perspective only, there is a natural deepening and widening (Borrás, 2008) of the scope of innovation policies, illustrated by what the EC calls “third Generation Innovation Policy” (European Commission, 2002). This means that departmentalisation may be much wider than the ‘classic’ gap between research and innovation policies. Bridging is also necessary with policy domains such as health, environment, transport, ICT, etc., as these other domains not only require and stimulate innovations but also affect the wellbeing of citizens and thus indirectly competitiveness. 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 governance process. 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 issue in the literature of innovation policy governance is the need for more active participation of end users, targeted as beneficiaries of specific policies and instruments. From the perspective of the end user a large diversity of policies and instruments 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 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, 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 instruments from the 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 to the development of policy, learning from implementation feedbacks is relatively less common (Mytelka and Smith, 2002). On the other hand, such decoupling may 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 policy design and implementation.

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) are demanding evidence of the

effectiveness of innovation policies (Boekholt, 2004). In particular, in the relationship between intermediaries which have 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 instruments such as 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* 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 evaluation of programmes and policies, and even on on-going policy monitoring as an aid to policy decision making is not only a result of these greater concerns with accountability but also a consequence of the increasing practice of New Public Management in different domains of policy.

The level of independence of the “middle layer” (composed of sectoral research councils, funding institutes, dedicated agencies, etc.) and its capacity to appropriate the process of policy implementation is therefore a key issue for accountability. There are however, large variations in terms of the role played by this middle level in policy design and implementation. Ireland for instance, has a relatively thin Ministerial level and a strong position for its agency Enterprise Ireland, whereas in comparison 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 structural funds have, by in large, appropriated the policy process and manage to maintain policy instruments and practices over decades, regardless of any strategic policy changes at a higher level (Laranja, 2007).

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 (that to a large extent decide on their importance, effectiveness and the influence of Advisory Bodies) 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 generate and monitor 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 it issues a 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.

### *1.3 Network Governance*

Governance of innovation policies is therefore becoming increasingly complex. While the use of very 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 identify 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, network governance is often identified as a key factor explaining the successful development of complex products under uncertain competitive environments (e.g. the musical instruments cluster in Italy).

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 governance’ are organisational arrangements mixing public, private resources and reflect a response to an increasingly interdependent world. 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 international networks with a global scope linking multiple policy domains at different levels have grown in number, organizational form and scope 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.

The advantages of NG is that it enables articulation and pooling of public and private resources in synergetic relationships that can improve overall problem analysis and solving capacity, while at the same time increasing societal participation. Networked forms of organization are therefore 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 having 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 use of new technologies (e.g. making information available on websites, intranets, etc.) may also be an important element of network governance. Certainly, gathering and making information available about overall policy strategy and monitoring facilitates learning across policy domains and enhances mutual adjustment by consensus. 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 further enhancing network governance.

For a wide complex domain such as innovation policy, and because traditional innovation governance mechanisms appear to have exhausted their potential for improvement, network governance should be realistically analysed to see what are the conditions under which it can improve a more effective policy coordination. There is, however, a need for more imagination in conceptualizing, and more emphasis on how to operationalize the concept of network governance in multiple policy domains.

## **2. The governance of Innovation Policies in Portugal**

In 1986 the 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, although over the last 30 years or so, the Portuguese Innovation system grew substantially, structural change has only happened quite recently. For example in 1981 GERD – Gross Expenditure in R&D was only 0,31% of GDP whereas in 2007 GERD amounted to 1,2% of GDP. However, it was not until 2007 that participation of the enterprise sector in R&D activities surpassed that of public sector, including universities.

Steady growth and recent changes in the innovation system 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 increasing complexity at intermediate levels, the governance structure 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).

Starting the late 1960s up to the middle 1980s, just before Portugal joining the EC, innovation policies that were basically research policies, were taken as an enclave of more general Economic and Social development policies. The *Junta* - JNICT - *Junta Nacional de Investigação Científica e Tecnológica* created in 1967 to articulate sectoral policies for R&D, was doing little more than collecting R&D statistics, promoting international funding and managing the public account of R&D 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 technology application areas such as geophysics, geology, hydrography<sup>1</sup>. 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 set 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 (through INIC - *Instituto Nacional de Investigação Científica*) was also 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 side they responded to scientific and educational programmes set by the Scientific Councils of their own universities. On the other hand, through INIC they were pressured to meet a different set of priorities, if they wished to find funding for their R&D projects (OCDE 1986, p.52).

This dual re-construction of the public R&D system in late 1970s and early 1980s, including PREs attached to different Ministries on the one hand and universities on the other hand, favoured a vertical multi-sectoral governance structure. 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 research policy was not seen as an issue that required inter-ministerial linkages. The first stage can therefore be characterized by problems of legitimacy at JNICT; a vertical governance rationale; a dual governance structure at the higher education sector; 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 Cohesion and Structural funds that could be used for further development of science and technology, innovation policy governance becomes essentially divided into two separate arenas. On the one hand the continuation of the expansion of the research system centered around the constituencies of PREs and Universities but investing strongly in building infrastructure and raising the number of qualified scientists. On the other hand, the Ministry in charge of economic policy initiated at this stage, a business support innovation policy through the development of a national network of technology centers in different sectors.

Overall, this led to an expansion of the system in terms of number supply side infrastructures 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 use of Cohesion and Structural funds for Science and Innovation policies also triggered not only the creation a more comprehensive policy instrument portfolio but also the creation a new breed of intermediary technocratic bureaus to manage programmes and action measures that later on would appropriate much of the design and implementation processes associated with innovation policies.

There was, therefore, a deepening of the bipolarization between research policy and the innovation component of economic policy. On the one hand, the policy rationale was centered around the linear model and trapped in the paradigm of Vannevar Bush’s (1945) “Science the Endless Frontier”. That is: science not matter what, would lead to social benefits and scientists would be best placed to decide from themselves the specific priorities of scientific development. On the other hand, the innovation component of economic and industrial policy favoured the neoclassic market failure rationale. Policy rhetoric at the time mentioned intangible factors (such as design and

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<sup>1</sup> 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*.

innovation) but was centered around “economicism” and in practice, policy instruments favoured 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 such a rapid “catching up” strategy even if polarized around two different arenas. However, by end of the 1990s, given the institutional diversity and the 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 envisioned programmatic articulation.

Hence, although Innovation Policy can be seen at this stage as an umbrella for sectoral policies, there were no corresponding changes in governance and, by and large, isolated poorly articulated sectoral policies, continued to dominate. In mean time, since the late 80s, the innovation component of economic development policies did have some impact in the weakest component of the innovation system – the enterprise sector. Making use of available structural funds for support to investment in machines and equipment, Portuguese companies became much better equipped, but failed to invest in intangible aspects of innovation such as qualified human resources, design, quality, internationalization, etc. This created a deficit of demand from enterprises (in particular SMEs) for the use of technologies capabilities installed in the much expanded scientific and technological infrastructure, therefore creating a need for new policies that could stimulate linkages that make the innovation system more effective (Laranja, 2009).

Overall across these three stages, and despite such strong growth and change in the system, 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 identified earlier in the middle 80s, when they called attention to Portuguese authorities to the fact that the main country that exports cork had only one researcher at INIA 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 section 2 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 design and implementation of the *Technological Plan* – TP since late 2005. During the 2005 elections campaign, the slogan that country would need a “technological shock” to accelerate modernization, originated the so called *Technological Plan* – TP. Perhaps influenced by the Open Method of Coordination, used for the Lisbon Strategy in Europe, the Technological Plan in Portugal is a “policy agenda for mobilization that envisions to promote a decentralised but articulated design/execution 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 private institutions (associations), firms, groups of interest and society at large.

The Technological Plan started with 78 policy measures but over the years the number of measures that it tries 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), long life learning, information society, technological modernization of public administration, technological modernization in the health sector, scientific research, and innovation in business enterprises. 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.

In the context of the development of Portuguese governance of innovation policies, coordination of such a wide scope of public policy measures crossing different policy domains broke with the multi-sectoral approach and the traditional silos described in the previous section but demanded a special cabinet GCNELPT attached to the Prime Ministers' office, to implement a new innovative mode of networked governance. Network governance mechanisms implemented since 2005 include:

(a) A network of "focal points" consisting of advisors of the Ministry's cabinets, to be responsible at each Ministry for gathering information and report to the central coordination unit CNELPT about implementation of measures of that Ministry that fall 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 serve to discuss progress reports and to discuss 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 quite frequent and serve to control of progress or to mediate particular needs of inter-ministerial interaction.

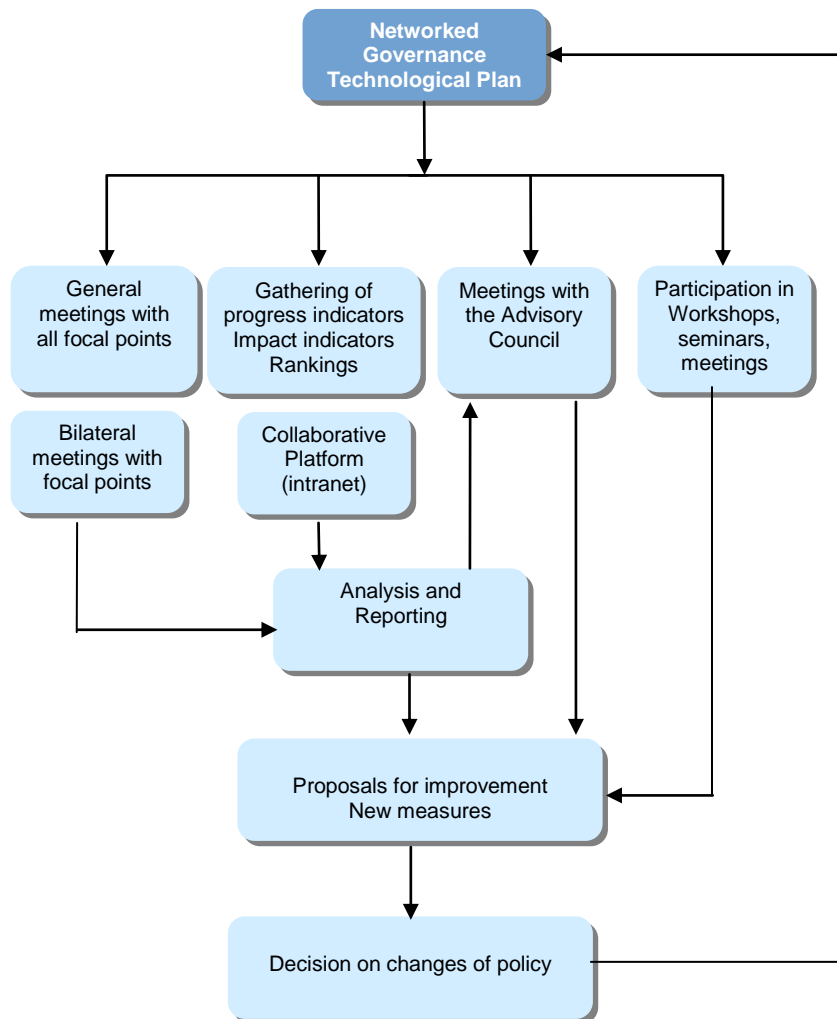
(b) Another important governing mechanism was the development of indicator-driven targets as an aid to strategic monitoring of policy. Beyond progress and result indicators usually defined at the level of each measure, the TP also defined impact indicators at a more aggregate level and introduced the 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 has 39 counsellor members. It is interesting to note that 8 members of the council come from universities, 26 from enterprises that undertake significant technological activities, and 5 from industrial associations, foundations and others. The Advisory Council meets twice a year and produces recommendations and suggestions to the reporting produced by the coordination of the TP. This Council does not have the high level as the National Innovation Councils implemented in other countries of Europe, nor does it have the same political legitimacy. 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 own measures for action. 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, also grew steady.

Figure 1 illustrates how network governance was implemented at the Technological Plan.

Figure 1



## 5. Discussion

In this paper we attempted to explore the key issues that governance of innovation policy faces, the potential advantages offered by Network Governance and the particular case study of the *Technological Plan* – TP implemented in Portugal since 2005. The requirements for a wider and more articulated innovation policy dealt in Portugal, by the TP, raises a number of interesting issues.

First the potential advantages of NG in terms of openness and breaking with horizontal and vertical cleavages are clear in the case of the Technological Plan. Although there are still tensions and claims between research policy and innovation policy, the supra coordination and the wide scope of the TP, adding other policy domains, have mitigated this classic gap. The extent to which this “closing the gap” will 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 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<sup>2</sup> 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 (users, firms, groups of interest, etc.) and helped to promote a wider consensus about the importance of technology and innovation. Where the NG at the Technological Plan may be less successful is that these targeted users and groups of interest were still left outside the cycle of policy design. Moreover, intermediate technocratic bureaus in charge of managing structural funds that control the policy implementation cycle, still have great influence in the design of specific policy instruments and pay little attention to the alignment of such instruments with overall policy. Therefore, despite the NG at the TP the decoupling of policy design (overall strategy) from policy instrumentation and implementation (feedback) is likely to continue.

Third, the introduction by the TP of an on-going formal monitoring system associated with indicator-driven targets, is 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, is 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 are 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 may however be associated to the TP rather than to individual measures or to their respective Ministries. Where there may be stronger difficulties is in learning on how to interpret the evolution of impact indicators as it is not always easy to associate impacts at the macro level with intended 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 Network Governance. Although both the network of focal points and the advisory council provide valuable suggestions, there is no formal foresight process, where the participants 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 which must be taken to make the achievement of this 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 summarise, the approach to a widening multi-sectoral innovation policy co-ordination, through the NG of the Technological Plan 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 rankings. In essence the NG of the TP enables some form of 'joined-up' government *i.e.* enables a shift from a narrow view of a multi-domain policy portfolio created by the summation of discrete policies and instruments and towards a dynamic, interacting policy mix agenda for innovation.

This is a most welcome step forward as a new coordination mechanism within the innovation policy system, and it seems 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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<sup>2</sup> Technology and Competitiveness Poles 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 structural 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.

## 6. References

Arnold, E. and Boekholt, P. et al (2003) Research and Innovation Governance in Eight Countries. A Meta-Analysis. January

Bache, I. (2004). Multi-level governance and European regional policy, in Bache I. and Flinders M. (eds). Multi-level Governance. Oxford: Oxford University Press.

Berner, T., Reinike, W.H., and Witte, J.M. (2004). Multisectoral Networks in Global Governance: Towards a Pluralistic System of Accountability. Government and Opposition Ltd., pp.191-210, Blackwell Publishing, Malden, USA.

Boekholt, P. (2004). Ensuring Policy Coherence by improving governance of innovation policy. TrendChart Background paper, April 27-28, Brussels

Boekholt, P. and Arnold, E. (2002). The Governance of Research and Innovation : An international comparative study. Report for the Dutch Ministry of Economic Affairs. With the collaboration of E. Deiacio, S. McKibbin, P. Simmonds, J. Stroyan, and John de la Mothe. Available at [http://in3.dem.ist.utl.pt/master/03itt/lec\\_2\\_4.pdf](http://in3.dem.ist.utl.pt/master/03itt/lec_2_4.pdf) (last accessed in February 2008)

Borrás, S. (2008). The Widening and Deepening of Innovation Policy: What Conditions Provide for Effective Governance? PRIME International Conference 2008 Europe-Latin America Conference on Science and Innovation Policy 24-26 September, Mexico City

Bush, V. (1945). Science: The Endless Frontier. Washington, DC: US Government Printing Office

Braun, D. (1993). Who governs intermediary agents. Principal-agent relations in research policy making, *Journal of Public Policy*, 13(2), 1993, pp.135-162

Braun, D. and Merrien, F.-X. (eds.) (1999). Towards a New Model of Governance in Universities? A Comparative View. London: Jessica Kingsley.

Caraça, J. (1999), A Prática de Políticas de Ciência e Tecnologia em Portugal, em M. Godinho e J. Caraça (orgs) O Futuro Tecnológico: Perspectivas para a Inovação em Portugal, Celta Oeiras

Dietmar, Braun and David Guston, 2003. Principal-agent theory and research policy: an introduction. *Science and Public Policy*, 30(5), 302–308.

European Commission (2002). Innovation tomorrow. Innovation policy and the regulatory framework: Making innovation an integral part of the broader structural agenda. Innovation Paper n° 28, DG-Enterprise. Luxembourg: Office for Official Publications of the European Communities

European Commission (2004). Innovate for a Competitive Europe, A new Action Plan for Innovation, A consultation paper prepared by the European Commission, 2.4.2004.

Edler, J., Kuhlmann, S. and Smits, R. (2003). New Governance for Innovation, The need for horizontal and systemic policy co-ordination, Paper for the Six Countries Programme, FhG-ISI

Georghiou, L. (1995). Research evaluation in European and National science and technology systems.” *Research Evaluation* 5.1 (April 1995): 3-10.

Georghiou, L. and Laredo, P. (2006) Evaluation of Publicly Funded R&D. Recent Trends and Perspectives. OECD Report DSTI/STP(2006)7, March 2006.

- Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., Trow, M. (1994). *The New Production of Knowledge*. London, Sage Publications.
- Jones, C., Hesterly, H.S., Borgati, S. (1997). A General Theory of Network Governance: Exchange Conditions and Social Mechanisms. *Academy of Management Review* Vol.22, n°4, pp.911-945.
- Keating, M. (1998). *The New Regionalism in Western Europe*. Cheltenham: Edward Elgar.
- Kersbergen, K.V. and Waarden, F.V. (2004). Governance' as a bridge between disciplines: Cross-disciplinary inspiration regarding shifts in governance and problems of governability, accountability and legitimacy. *European Journal of Political Research* 43: 143–171, 2004
- Koschatzky, K. (2000). *The regionalisation of innovation policy in Germany – Theoretical foundations and recent experience*, Karlsruhe: Fraunhofer ISI (Working Paper Firms and Regions R1/2000)
- Kuhlmann, S., Boekholt, P., Georghiou, L., Guy, L., Héraud, J.A., Laredo, P., Lemola, T., Loveridge, D., Luukkonen, T., Polt, W., Rip, A., Sanz-Menéndez, L., Smits, R. (1999). *Distributed Intelligence in Complex Innovation Systems*. Final report of the Advanced Science and Technology Policy Planning Network (ASTPP), Karlsruhe. [http://www.isi.fhg.de/abtlg/ti/pb\\_html/final.pdf](http://www.isi.fhg.de/abtlg/ti/pb_html/final.pdf).
- Lagendijk, A., Cornford, J. (2000). Regional institutions and knowledge – tracking new forms of regional development policy. *Geoforum* 31, 209-218.
- Laranja, M. (2007). *Uma nova politica de inovação em Portugal? A justificação, o modelo e os instrumentos*. Almedina Coimbra.
- Laranja, M. (2009). The development of technology infrastructure in Portugal and the need to pull innovation using proactive intermediation policies. *Technovation* 29, pp. 23–34.
- Lyall, C. (2007). Changing boundaries: the role of policy networks in the multi-level governance of science and innovation in Scotland. *Science and Public Policy* 34(1), 3-14.
- Mytelka, L.K., Smith, K., (2002). Policy learning and innovation theory: an interactive and co-evolving process. *Research Policy* 31 (8), pp.1467–1479.
- de la Mothe, J. (2001). *Knowledge Politics and Governance*. In: John de la Mothe (ed). *Science Technology and Governance*. Continuum, London, New York.
- OCDE (1986). *Reviews of National Science and Technology Policy: Portugal*, DSTI/STP December 1986, Paris
- Perkonen, A. (2006). The problem of integrated innovation policy: analyzing the governing role of the Science and Technology Policy Council of Finland. *Science and Public Policy* vol.33 n.9, pp.669-680.
- PT (2005). *Plano Tecnológico: Uma Estratégia de Crescimento com base no Conhecimento, Tecnologia e Inovação*. Documento de Apresentação. Available at <http://www.planotecnologico.pt/document/OPlanoTecnologico.pdf>
- Rip, A. (1997). A cognitive approach to relevance of science. *Social Science Information*, 36, 615–640.
- Ruivo, B. (1998) *As Políticas de Ciência e Tecnologia e o Sistema de Investigação*, Lisboa, INCM.