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**Public/Private partnerships and innovation policy:  
The Spanish experience**

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# **Public/Private partnerships and innovation policy: The Spanish experience**

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This paper aims to analyse the dynamics of relationships between public and private sector in the context of S&T policies and to present some experiences of Public/private partnerships (PP/Ps) in relation to innovation policy. It also attempts an understanding of the forces and factors that explain the increase of collaboration between public and private sectors, and its growing relevance in the discourse of S&T policies.

The argument I put forward is that the general emphasis on public-private collaboration in science, technology and innovation policies is not only the outcome of a process of changing rationales for policy intervention to cope with problems of efficiency and implementation of traditional policies (OECD, 2002b), but also the result of general factors such as: some concrete S&T policy legacies, the overall Spanish political context emphasis on consensus, the tradition of corporatist arrangements, and the general concern on Industry-Science Relationship (ISR) issues, such as technology transfer and R&D collaboration.

## **1. Legacies, political context and policy frames**

Spanish S&T policies contain a set of policy legacies and inheritance that foster a favourable consideration of public and private sector collaboration in science, technology and innovation (STI), even if it is just limited to policy discourse. Those S&T policy legacies have framed the ideas, discourse and dominant implementation models, but also the preferences of most STI actors in the last 20 years. Different types of S&T, political and policy experiences in the past have created legacies relevant for PP/Ps enhancing and shaping innovation policies.

The first set refers to organisational experiences, some of which are as follows: a) Until the mid seventies, a particular organisational approach existed within the *Consejo Superior de Investigaciones Científicas* (CSIC), the *Patronato Juan de la Cierva*, an umbrella organization, with many applied research institutes working in a very close association with the different industries and even receiving funds directly from industry through a mandatory contribution or a levy (López-García, 1997-1999). b) Another experience, which still persists in a transformed organizational form, was the creation in the mid sixties of “Research Associations” (*Asociaciones de Investigación*) to provide industry, organised in a sector-based way, with technology and new know-how from the existing public research

centres; the research associations were promoted and protected directly by government subsidies but they were also sustained by fees paid by the industry associates (Orgiles, 1989). c) Also of relevance for understanding the policy legacies related with public and private collaboration, was the strong relationship that the Spanish engineering schools had with industry; it must be recalled that the Spanish Universities, with minor exceptions, concentrated all engineering schools in three universities, named *Universidades Politécnicas* (located in Madrid, Catalonia and Valencia), enabling industry to clearly identify the source of supply of qualified labour force with technological skills (Espina, 1997).

Certain relevant experiences contribute to understanding the importance of PP/Ps, rooted in the dominant consensual political culture emerging from the transition and consolidation of democracy in the mid and late seventies (Colomer, 1995). Furthermore, a strong tradition of corporatist arrangements in the wages, employment and socio-economic negotiations between Government, unions and business associations built up in the 70s and the early 80s (Perez Diaz, 1993), and there was generalised use of participatory advice-related mechanisms in many of the policy domains, regardless of their effectiveness, such as the environment, employment, health, science and technology, etc.

A third element in understanding the relevance of the approaches promoting public-private collaboration in the implementation of innovation policy refers to the dominant method of tackling Spanish S&T problems and the proposed high-level solutions to those problems. Spain did not even put forward any kind of formulation of the European paradox type. Since the early eighties, all the governments have defined the S&T problems as being related to the "low level of the Spanish science base", associated with the size of the system and the economic resources available, and the impressive "technological deficit", measured by the high structural deficit in the country's Technology Balance of Payments (Sanz-Menéndez, 1997). The solution adopted was to try to cope with both problems at the same time, "through increasing S&T capabilities to serve the socio-economic needs of the country" (Sanz-Menéndez, 1995). In this context, in practice, two main areas of policy intervention were: the issues connected with "technology transfer" from PROs to firms, and the development of joint-research projects between PROs and companies.

All those shared visions were embedded in the main instrument of S&T policy implementation: the National R&D Plan. The Law of Promotion and General Co-ordination of Scientific and Technical Research (Law of Science -13/86), created the basic tool for the Spanish S&T policy; the National R&D Plan resembled the model of "strategic R&D programs" of the RTD Framework Program, but also included general funding mechanisms for "non-oriented and non-prioritised" research activities.

The Law laid down a model of S&T policy designed to steer the RTD system (Rip & van der Meulen, 1996). One of the main concerns was the "coordination of the S&T system", which included the "coordination of public and private activities".

Also of relevance was the lack of permanent professionalised bureaucracy in the domain of S&T policy that has precluded the development of a radical process of in-house learning. There have always been a lot of part-time academic researchers involved in the management of RTD programs and policy-making. The high staff turnover determined the relevance of the arrival of new officials, who brought their own ideas and personal grassroots experiences into the policy making process, yet created difficulties for policy learning.

## 2. The RTD policy focus: Academia versus firms

In the formative years, S&T problems have been framed linking “scientific underdevelopment” to the “technological deficit”. The institutionalised solution consisted of a new funding system with priority R&D National programs, designed and managed within the Ministry of Education and Science. The system set up in mid-eighties was mainly managed by “academic interests”, and in times of scarce resources, most funding is “captured” by clients from the public academic community (Sanz-Menéndez *et al*, 1993). In the late eighties and early nineties, the Ministry of Industry started to develop a new form of “industrial policy”, namely funding programs that addressed the technological needs of firms.

In the late eighties and early nineties, overall policy rhetoric focused on the “science-technology-industry system” and on “funding research for the national priorities to serve the economy and society”; however, policy action was not really co-ordinated and consistent with declarations. The institutional architecture of the public bureaucracy was fragmented and each Department followed “traditional” approaches to serve its own clients (Sanz-Menéndez and Muñoz, 1994). On the “academic oriented policies” side, a lot of emphasis was placed on “technology transfer issues”, while the underlying rationale in “industrial technology policies” was to subsidise business firms’ technological development projects, and later their innovation projects. Nonetheless, the ministerial driving force came from the Education Department.

In 1996, when the Conservatives took office, the “pro-business” orientation gained a lot of leverage within the Cabinet. The Ministry of Industry was allocated further budget resources, reflecting the new Government’s preferences. Clearly the new priority of the Government moved to a more innovation-centred approach, with firms being the main players of the game. In 2000, the Government created a new Ministry of Science and Technology, which concentrated almost the entire STI policy domain, with the exception of biomedical and clinical research funding. Policy orientation has continued to be dominated by the “innovation” model and the attempt to promote the increase private sector RTD efforts, mostly through traditional subsidies and soft loans.

Public/Private collaboration, either in the implementation of RTD activities, through joint research projects, or in the design of intervention instruments seeking a consensus with research actors, is embedded in the general models of Spanish Science and Technology Policy. In the nineties, new experiences (cases) using PP/P mechanisms have emerged and more and more policy initiatives based on an increased need of PP/Ps have been promoted. In recent years, many new initiatives “from below” have incorporated PP/P ideas, but policy mechanisms and instruments have also increased experimentation in these fields. However, most innovations in public policies, even those that could strictly be classified as PP/Ps experiments, have emerged as the result of pressures from below or decentralised initiatives to cope with other policy problems, such as the pricing of pharmaceutical products.

One outstanding feature about the Spanish case has to do with the origins of PP/Ps initiatives. In many cases these initiatives are not so much the result of a “new strategy”, made explicit by the government, but the result of initiatives from below that seek public recognition and legitimisation.

However, the fact that PP/Ps approaches are a relevant feature of Spanish S&T does not preclude the relevance of other features influencing the underlying dynamics that should also be taken into account. We suggest that, in addition to the emerging new policy rationales that promote PP/Ps, there are also structural features of the S&T policy that really influence the dynamics of choices. Those features are mainly related with the substantive nature of STI policies in Spain; any distributive policy is a policy whose main mechanism of action is funding by its very nature, and it always mobilises powerful vested interests vis-à-vis the allocation of resources to the final clients. Of course, the PP/Ps model could potentially become a compromise solution to those distributive conflicts between academic interest and companies.

In the next section I review some of the cases of emergence of PP/Ps and I establish a typology of the different cases, those emerging from below and those embedded in the policy rationale, designs or interventions. Different dimensions help us to understand this diversity: On the one hand, I have found cases of successful PP/P from below in which the initiatives have come from the private side, demonstrating public involvement and support (technological centres; etc.); on the other, there are also cases in which Government took the initiative to promote an increased cooperation between public-private partners in developing RTD and innovation projects (PROFIT projects, etc). These types and cases are reported in the rest of the paper.

### **3. A Typology of emerging experiences in PP/P in Spanish STI policies and strategies**

In this section I will analyse some cases or initiatives that could be characterized as “public private partnership” for innovation. The cases show the diversity of driving forces that explain the dynamics and evolution of the quest for closer collaboration between the different actors of the innovation system in pursuit of national objectives and general interests.

When analysing the different interventions concentrated mainly at central government level, it is very interesting to observe PP/Ps principles embedded in most of the interventions; however, due to administrative procedures and lack of state capabilities, the dominant implementation method was not explicitly based on "bilateral or trilateral contractual agreements"

I have identified 8 different types of PP/Ps initiatives, some of them more traditional instruments with embedded public-private collaboration principles and some more clearly featuring as canonical PP/Ps. The main classificatory variable is the origin of the initiative, either from policy makers or from below. The types, from less to more canonical PP/Ps, are: 1) Public funding for RTD and innovation in a context of encouraging public-private research collaboration. 2) Focusing, clustering and agglomeration strategies under PP/Ps. 3) Changing the R&D regulatory environment to encourage PP/Ps and blurring boundaries between public and private. 4) Competence RTD centres in specific technology areas. 5) New commercialisation, start ups and spin off strategies of PRCs. 6) Constructing and supporting common pool resources for technological services and innovation and under PP/P. 7) PP/Ps for strategic private funding of RTD in general interest areas. 8) Steering Public research activities under PP/Ps

*Public funding for RTD and innovation in a context of encouraging public-private collaboration*

In Spain, the main instrument for promoting innovation is public funding; the policy portfolio includes subsidies and repayable loans for developing RTD or innovation projects by firms, alone or in cooperation. In the last six years, the funds available for supporting firm innovation and RTD projects have increased much more than the traditional block grant and competitive academic funding for public sector research.

There is an increasing emphasis on developing RTD or innovation projects that involve public-private sector collaboration, but in the mid-sixties there was already a “technology transfer” initiative called “concerted R&D programs” that promoted cooperation between PROs and firms.

In the following four different initiatives, which place different emphasis on the issue of collaboration and the terms of cooperation, in some cases which it is the firm, and in others the PRO, which takes the “initiative” for public-private (company-PRO) collaboration.

**PROFIT** (*Programa de Fomento de la Investigación Técnica*) is the key instrument for promoting and encourage the development of RTD or innovation projects in all S&T areas; PROFIT is also structured to follow the national RTD priorities defined in the National Plan for Research, Development and Technological Innovation (2000-2003); the program is run and managed directly by the Ministry of Science and Technology. There is a specific type of project called “in collaboration”, but there is also a formal incentive for “collaboration” in all types of project proposals, because the “evaluation procedure” awards high marks to those not presented alone by individual firms. PROFIT approved subsidies for more than 700 M€, in 2001, and 20% of the projects were formally under cooperation modalities, but 83% of the approved projects had some type of relationship with other research actors, through subcontracts or other similar types of relationship (Castro, 2001).

The **concerted industrial research projects** (*Proyectos Concertados*) are managed by the CDTI, the Industrial Technology Development Centre, a funding agency that reports to the MCYT. This scheme aims to finance pre-competitive research activities by industrial firms that are carried out in collaboration with PROs or technological centres. Collaboration is mandatory in all the projects. Firms can apply for a subsidy to pay up to 70% of the cost of the PRO collaboration contract, but the overall cost of the PRO’S participation cannot exceed 20% of the total project budget. Firms can finance 60% of the project budget with “repayable loans”, to be repaid over 6-8 years at 0% interest rate. In recent years, an average of 50 projects approved every year have received subsidies for 30 million € (Molero and Buesa, 1998; Acosta and Modrego, 2001).

The **PETRI projects** (*Proyectos de Estimulo a la Transferencia de Resultados de Investigación*) are a specific type of funding mechanism designed to stimulate the transfer of research results produced in PROs by means of subsidies to cover the additional effort of transferring the results of research projects to the industrial sector. This type of support scheme has been running since the early nineties, providing an average, in the last five years, of 3 M€ for supporting an average of 50 PETRI project per year.

The “**P4 collaborative projects**”. This new scheme was set up in 2000, in the context of the new National RTDI Plan, with the aim of developing “pre-competitive” development in projects led by a PRO, but with the involvement of the firms that are going to develop the

product. In this single call, 221 projects have been approved with subsidies for a total of 40 million €.

#### *Focusing, Clustering and Agglomeration strategies under PP/Ps*

These include a set of initiatives that clearly serve to promote collaboration between public and private partners.

The first is a planning instrument, designed under the National RTDI Plan (2000-2003), though not very well implemented, called “**key actions**”, which aim to concentrate and focus public and private sector research activities on certain key technologies or areas, such as space, aeronautics, nano-technologies, etc.

**Science and Technology parks**, in Spain at least, are also a clear case of emerging PP/Ps. Most S&T parks are public regional or local initiatives aiming to facilitate the connection between firms and the PROs. (COTEC, 2000), and usually involve a broad coalition of local public and private institutions such as universities, local and regional governments, banks, etc. In addition, recently the Ministry of Science and Technology launched a program with two structural measures in support of S&T parks, infrastructures and services, mostly using repayable loans.

Last, but not least, some regional governments (Gobierno Vasco, 2000) have managed to identify specific technological clusters at regional-local level and have provided them with recognition and support as tools for promoting PP/Ps.

#### *Changing the R&D regulatory environment to encourage PP/Ps and blurring boundaries between public and private*

There is another set of instruments that is related to actors’ collaboration incentives. Traditional regulations have been changed and new funding support mechanisms have been implemented to narrow the gap between public and private research activities.

New strategic actions to “facilitate” public-private collaboration have been approved, such as: the possibility of obtaining grants for completing PhD dissertations in firms; the approval of mobility from public to private business and new regulations for sabbatical or temporary stays in private industries up to 4 years without losing one’s tenured public position; more flexibility for PROs researchers involved in private business, especially ownership of new technology based companies, etc.

#### *Competence centres in specific technological areas: institutionalising networks under PP/Ps*

The National Research, Technological Development and Innovation Plan (2000-2003) approved a new type of tool, especially associated to some RTD programs. The new scheme was called “**competence centres**”, which were expected to establish PP/Ps for enhancing technology transfer, to increase firms’ absorption capacity firms, and to steer public research activities in the direction of the sector companies’ interests.

A **processed meat product S&T competence centre** (CECOC-PTC) has been approved and established under the initiative of an industrial association, in the sector of meat processing sector. This is a joint effort by the INIA (national research centre in agriculture and food research), IRTA (the Catalonian research centre in agriculture and food research), and the industry association (FIAB). The centre is “virtual”, with an underlying “network” model and public calls for new research projects to join the centre have been launched with the aim of “mobilizing” capabilities for improving innovation in the sector. Last year the INIA and Ministry of Science and Technology announced public subsidies for the development of projects and infrastructures in this domain.

Also under the model of competence centres, the Health Research Fund (FIS-*Fondo de Investigaciones Sanitarias*) of the Ministry of Health has launched a public call to establish “clinical and biomedical research” networks between Hospital, universities, PRCs and pharmaceutical companies.

#### *New commercialisation, start ups and spin off strategies of PROs*

One process that implies a lot of public-private collaboration has to do with the new PROs strategies in relation to knowledge management such as commercialisation, start ups and spin off creation (García and Sanz-Menéndez, 2002). The regulatory environment changes and the increase in entrepreneur support programs with subsidies and grants have opened the door for new strategic approaches of some PROs for knowledge management. Universities and PRCs have started to support, and even become directly involved in the creation of new technology-based companies (NTBC) or to form joint ventures for the exploitation of the stock of knowledge created. The increased development of the risk and venture capital provided by Funds, usually under PP/Ps models combining banks, firms, universities, etc., has also been paralleled by government support programs such the NEOTEC initiative managed by the CDTI, or others established by the regional technology development agencies of Catalonia (CIDEM) or the Basque Country (SPRI).

#### *Constructing and supporting common pool resources for technological services and innovation under PP/Ps*

One of the historical lines of PP/Ps for S&T was an institutional arrangement called “Research Associations”. Starting in the mid sixties, Research Associations were formed around specific industrial sectors to serve the firms with additional technological capabilities; with strong public backing, the RAs became collective technology and knowledge suppliers of the firms.

After significant public support in the seventies and eighties, a new generation of entrepreneurs managed to rebuild the research associations as clubs and to attract enough firms to paid a small membership fee and some extra funds for customized technological and innovation services. Most of these Technological Centres (Giral, 1999), the new name for the collective infrastructure, are to be found in two Spanish Regions (Valencia and the Basque Country) where the Regional governments also lent significant support. Public support has become conditioned to the redefinition of their mission: from supplying specialized technology for the members of the Technology centres to a general one of serving as a critical infrastructure (a common pool resource) for the innovation system.



In the late nineties, the PROFIT Program and the National RTDI Plan opened up new support schemes for Technological Centres under the so-called “horizontal measures”, because the Technological centres, a clear expression of PP/Ps, have become a new strategic player in the Spanish innovation system. Although they are private, they also have structural ties with the public sectors, and some of their Board members are appointed by the government, in exchange for permanent funding and support.

#### *Steering public research activities under PP/Ps arrangements*

There are also interesting examples of the private sector’s permanent involvement in the steering and funding of public research institutions, especially in the creation of new research centres and the establishment of long-term PP/Ps agreements. Those arrangements have been developed at a meso-level of the research organisations and serve the purpose of steering public research activities (Alonso *et al*, 2001; Sanz-Menéndez and Cruz-Castro, 2003).

In the mid-nineties the CSIC, the biggest Spanish research institution and Pharmacia Uphold signed an agreement that entitled the pharmaceutical company to use the CNB (National Centre for Biotechnology) Department of Immunology and Cancer as a corporate laboratory in Spain in exchange for contributing to finance the CNB, which today employs more than 500 people, with a total of 55 M\$ throughout the 7 year term of the agreement, which finished in 2000. This case is clearly the result of key role of “scientific entrepreneurs” matching private needs and public infrastructures.

Another example is the creation of the new Spanish CNIO (National Centre for Cancer Research) in 1998, under the supervision of the Ministry of Health. The CNIO is “non-profit making foundation” that receives block grant funding, competes for public funding and gets additional support for private industry through collaboration agreements and sponsorship. For example, Pfizer, Microsoft, Hewlett Packard, etc. have become permanent sponsors of the Centre. In this case it is the director of the centre, now with more than 400 people working there, who has played a key role in raising new funding for their scientific plans.

There are also cases in which Business has taken the initiative. For example Merck, Sharp and Dome (MSD) has research facilities in Spain on which it spends more than 35M\$ a year, and has recently established a joint research centre with Regional Government of Catalonia, the CSIC and the Hospital of Santa Cruz and San Pablo for cardiovascular research, with a contribution of 3 million euros.

#### *PP/P for strategic private funding of research on general interest areas*

A very innovative way of dealing with complex problems, and clearly implemented under PP/Ps principles, has been the agreement between the Ministry of Health and the Association of the Pharmaceutical industry (*Farmaindustria*). The agreement is part of the regulatory environment on prices of pharmaceutical products to be bought by the national health system.

The industry has agreed to increase R&D investments to 1,352 Millions euros for the period 2002-2004, with 1/3 to be spent in non-firm laboratories. Additionally the industry is going to provide 150-300 million euros for a fund to finance special R&D projects in the National

Health System. The fund will be managed with the Ministry of Health's regular competitive funding mechanisms: The Health Research Fund (FIS). This is a case of "private money" contribution, with public management, to finance research activities in the public research sector.

#### **4. Exploring the driving forces behind PP/P initiatives: an extrapolation from Spain**

I have described the flourishing of public-private collaboration in Spain in the context of new orientations of science, technology and innovation policies. This approach is embedded in the dominant policy approach, so one might say that it is "old wine in new bottles". However, the forms of collaboration do not appear only as the traditional forms of seeking "public money for private purposes"; there are also significant cases of "private money for public actions".

In addition to new policy rationales (OECD 2002a), other forces contribute to explain PP/Ps in Spain: some "institutional legacies" and "past learning"; the broad political culture; some policy "experimentation"; changes in the political "preferences", etc. However, canonical PP/Ps have limited development because of the general policy design and implementation models.

The spreading of PP/Ps throughout Spanish STI policies could be explained in terms of inheritances and legacies, but also in functional terms due to the "benefits and gains" that they bring to innovation policies. Public-private collaboration principles are based on mutual consent contracts that go beyond the "delegation" principles underlying traditional implementation policies. These traditional policies were based on the ideas of principals and agents, implying problems in monitoring the agents, moral hazards, etc. The new approaches promote better-defined aims and objectives, reducing the risk of any cheating by the actors involved in policy implementation; PP/Ps result from a more politically-oriented process, with the initiative being taken either by government or from below, and aim at consensus and compromise. The new approaches make STI policy implementation more efficient but also, if well designed and implemented, provide policy with support and legitimation.

Although PP/Ps afford *advantages*, by confronting traditional administrative intervention, there are also potential distributive "*conflicts*" that emerge in the context of PP/P. Coping with the new forms of potential conflicts requires special care and management, particularly because "distributive" conflicts over STI policies, in situations characterised by scarce public resources, could be very disruptive of the PP/Ps. However, the limits of building the new approaches for policies are often represented by the limited institutional and administrative capabilities in government to deal them with; there are no effective or efficient policies without institutional capabilities.

Cooperation between government and research actors has been and today is a key principle of science, technology and innovation policies in Spain, yet some lessons can be drawn by analysing the emergence of PP/Ps in the Spanish situation: 1) Political preferences matter. Generally speaking, the Government's "pro-business orientation" create a much better environment for encouraging public research actors and private companies to make joint innovation efforts. 2) The level of resources available in the system and the degree of maturity and development of the actors are also important factors in the PP/Ps development

process. 3) The configuration of the “science, technology and innovation policy domain” and the institutional arrangements inside the Government are highly relevant in explaining the degree of implementation and development of PP/Ps. 4) The new ideas geared to innovation, with a very significant role for collaboration between different research and technology actors, also influence and shape the design of the new policy instruments. 5) Gains in legitimation (if there is a consensus-building process among actors) with the use of PP/Ps mechanisms emerge in the short term, whereas efficiency gains cannot be assessed until the outcomes of such experiences are evaluated in comparison with other existing models.

A new, or evolved policy rationale is driving the innovation system towards a more PP/Ps orientation as a new condition for more “intelligent” public intervention and funding, yet at the same time the new initiatives and experiments from below (firms and PROs) demonstrate that there is a “societal demand” for more PP/Ps approaches.

Additional lessons could be drawn from the Spanish experience: A more pro-business orientation of STI policies favours the development of PP/Ps, but the institutional architecture of STI policies (Education and Science Departments versus Industry and Technology Departments) often creates major difficulties due to the general “customer-client view” of the Departments in the context of distributive politics. International dissemination of PP/Ps for innovation policies is a relevant factor, but “policy entrepreneurs” and “strategic actors” (with negotiating skills) are needed to overcome the pervasive battles over distributive policies in inappropriate institutional environments and to build up an “advocacy coalition” for PP/Ps.

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