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**The dynamic of the Spanish public and semi-
public non university research centres:
Country Report**

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SPRITTE- Spanish Policy Research on Innovation & Technology, Training &
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1. The historical context of the evolution of Spanish Research Centres

The re-creation of Public Research Centres and the Ministerial initiatives (1939-1975)

The Spanish civil War (1936-1939) and its aftermath seriously damaged the research system. The innovative environment in the thirties, at the time of the *Junta de Ampliación de Estudios (JAE)* and the *Fundación Nacional de Investigaciones Científicas y Ensayos de Reformas (FNICER)* (Sanchez Ron, 1990), disappeared due to the emigration or the death of the best Spanish academic people.

The CSIC: Consejo Superior de Investigaciones Científicas

In 1939, the same year that the CNRS was established in France, a new institution was created in Spain by the Franco regime: the CSIC (Consejo Superior de Investigaciones Científicas) that brought together the “confiscated properties” of the Republican JAE-FNICER.

In the creation and during the first years of the new institution, various streams were combined (Sanz Menéndez, 1997): a) Some conservatives researchers –some of them trained in Germany at the Kaiser Wilhelm Institution- took control over the resources of the new CSIC. b) The Political regime attributed CSIC a main role in “bringing, accumulating and producing new knowledge” for the economic reconstruction and for the “new society”; this role was developed in close connection with the INI, the instrument for the industrialization of Spain. c) The CSIC also got the role of drawing the general designing of the “Spanish science policy” and of advising the “caudillo” in what referred to science and technology issues. d) At the time, there were no research infrastructures at the universities and the CSIC institutes started to be populated by university professors that were developing their research activities (in the forties and fifties very primitive ones) at the CSIC.

In organisational terms, for many years CSIC was simply an umbrella organisation with very little internal coherence; it was composed by 8 *Patronatos*, that organized the Institutes and research centres under their areas independently. The real organisational power was at the *Patronatos* (the biggest one was the “Patronato Juan de la Cierva (PJC)”, on charge of the Technical research area) (López García, 1997, 1998 and 1999).

Core funding of the CSIC came from the State General Budget in a very irregular way, especially because of the fiscal weakness of the state and the overwhelming “military and defence needs” of the country. In some industrial areas some especial levies were approved (coal, steel, etc), and the industries within these sectors paid an annual amount “for research and technical assistance”. However, some tensions and conflicts between public sector and private industries on the use of the funding emerged.

Most of the people working within CSIC had very diverse and ambiguous labour status until the mid sixties. There was no clear way or procedure of access to a researcher or professional status. The mix was composed by a lot of university

professors and many grant holders (“*becarios*”) paid locally. In summary, the organisational form of the CSIC was quite complex at the time.

Other Research Centres

The first decades of the Franco regime were the times during which, against the “rhetoric of the CSIC as supreme actor on research matters”, the diverse Ministries started to create or re-build some of its historical own research centres.

The Ministry of Air (today Defence) re-established its INTA (Instituto de Técnica Aeroespacial) (Sánchez Ron, 1996); the Agriculture Ministry consolidated the centres that latter, in the early seventies, would be INIA; the IEO (Instituto Español de Oceanografía) consolidated; the same happened with the JEN (Junta de Energía Nuclear) (Ordoñez and Sánchez Ron, 1996); etc.

Thus, without any doubt, the model followed by the Spanish Ministries was very simple. When they had a need of scientific or technical knowledge, they created a centre, and thus they consolidated “in-house capabilities”. In summary, the Spanish public research centres were institutions set up by the Ministries and funded from the National Budget. The majority of their employees had civil servant status (though contracted workers were also present) and their research activities were carried out in line with ministerial interests.

The activity within the centres was managed under a system of bureaucratic hierarchical authority. The allocation of resources to the different projects, units or individuals was based on the criteria of the administrative authority of the directors who, in most cases, had the status of Director Generals named by the Ministry. There were almost no external sources of finance and, in some instances, the dependence on the Ministry was so great that the centre was not allowed to accept external funding (either through contracts or grants).

As a conclusion, we could say that during the Franco’s dictatorship, the public R&D centres were the only centres carrying out research in Spain as “the majority of scientific research was carried out in the government centres or institutions and from the financial point of view, 85% of the total research expenditure for the country was channeled through seven R&D centres” (OECD, 1964).

The Universities were very few, and they worked on the model of the “teaching universities”. In 1966 there were only 12 public universities, most of them created centuries ago, and 4 private universities owned by different church institutions. Between 1968 and 1975 another 10 public universities were created plus the “Open University”(Distance Teaching University-UNED).

Also relevant was the role of some “nationalised” industries, under the public holding INI (Martín Aceña and Comín, 1991) developing some technical research activities, while “research” was an unknown word in private industries.

As a balance we could say that the dominant pattern of research development in Spain, before transition to democracy, was direct implementation by government-owned research centres. Besides most of the research developed was based on replication and assimilation of techniques developed abroad, and the main orientation of research activities, and especially science policy, was industrial technology. This latter strategy produced many criticisms from academic scientists, as the OECD reported in 1971 (OCDE, 1971).

The situation at the beginning of the transition to democracy in Spain (end of seventies).

The CSIC (Council in its name), was probably thought to be a Research Council in the mind of their first actors, however it evolved mainly as a research performer. In fact no Research Council model for the funding of competitive organisms was established in Spain. In 1964 a National Fund for R&D was created and the CAICYT (Comisión Asesora para la Investigación Científica y Técnica) was in charge of the management of that small competitive funding system.

In the sixties, a generation of young Spanish researchers trained abroad, started to come back, and most of them to the CSIC. At that time, there were no permanent research jobs at the institution yet, and the basic figure was that of “Scientific Collaborator”.

The University was still a place in which teaching was the main activity (because of the scarcity of research infrastructures), but, in contrast to the CSIC situation, the university system of access to the jobs (3 types of permanent positions) was clearly institutionalised. The Ministry of Education controlled the Universities, as well as the access to tenure within them through national exams.

Between 1968 and 1975, 11 new public universities were created; additionally in 1972 the Ministry of Education and Science, the owner of the public universities, created for the first time a “research” budget to allocate among the University Departments. The seventies was the time in which a massive entry of students into the University took place. The universities also grew in lecturers, especially temporary ones.

At the same time, the CSIC growth of its own personnel implied two dynamics: a) a break up of its links with universities (due to power conflicts) b) a battle between the more academic scientists and those that had a more sensible approach of cooperation with industries; in the context of that conflict, the winners were the academic scientists that started to search for a resemblance of the university conditions, but in a independent organisation. It was along this decade that a stable system of access to tenure research jobs was established at the CSIC. Organisational reforms also occurred in those years. In 1974 a Ministerial decision unified all the Patronatos and later created a single Secretariat for the CSIC. Also in 1977, the first democratic Statute of the CSIC was approved, with democratic elections of institutes’ directors and all the directive jobs, except the President of the CSIC, who was appointed by the Government. The first half of the seventies was a time of conflicts, union unrest and the consolidation of a permanent research staff at the CSIC.

The other big public research centres were significantly dependent on the political dynamics and the demands of their Ministries of control. All the organisational structures, the types of jobs, the budgetary and financial practices were different among them. But at the end of the seventies the first attempts to exchange experiences and managerial practices started, promoted by the President of the CSIC (Nieto, 1982).

The emergence of the Spanish S&T policy and first normative reforms: The Law of Science (1986) and the consolidation of the Universities as main players in research.

The new Constitution was passed on December 1978. In those years high inflation and financial problems in the State were the dominant issues. Research and universities were considered important topics, but not as important as inflation, the industrial crisis, the construction of a modern fiscal system, the creation of an unemployment protection system, etc. Funding for research and the situation in the public research centres were critical. However reforms had to wait until a stable socialist government entered into office at the end of 1982.

The regulation of Universities was a “Constitutional matter”, but it was not until 1983 that a new Law (*Ley de Reforma Universitaria*) passed by the socialist government which reformed the whole University governance system. One of most relevant dynamics that evolved with the reform was the recognition of research centres within Universities; besides, the new approach implied that research was a necessary competence for university lecturers and professors.

Higher education and research were relevant topics on the agenda of the first socialist government. Along with this changes, the eighties witnessed a multiplication of the availability of funding, with increases of budget growth in the amount of “research activities at the universities”.

The model that decision makers had in mind at the time of reforms was one in which the university was the centre of research activities in the public sector, through the combination of “teaching and research”. The US research university was the model, but with significantly less resources. However the strategy of the Ministry of Education was that universities would be predominant over Public Research Centres. In 1990, there were already 34 public universities, and the researchers (FTE) counted in this sector had passed from 7,318 in 1979 to 18,904.

At the same time, over the eighties, as a result of the processes of modernization and standardisation of the Public Administration and later on the budget restrictions, most of the Public Research Centres were under stress. Their staffs were almost stable, even without recruiting to replace the people that retired. Some of them were under severe restructuring, such the INIA (Instituto Nacional de Investigaciones Agrarias y Alimentarias) –see case study-, that in 1984 was splitted into pieces and all the research centres located in the different regional were transferred to their regional governments. The size of the INIA handled by the central government was reduced to almost a third compared with the previous situation. There were also great changes in the areas of health research under the Ministry of Health and Consumer Affairs, because the General Law of Health (Law 14/1986) established the FIS (Fondo de Investigaciones Sanitarias) as a Funding Program and the Instituto de Salud Carlos III, aggregated the different research centres in epidemiology, etc. owned by the Ministry.

In 1986 the Law of Science (Law 13/1986) was passed. The Law created a National R&D Plan that helped to stabilise the competitive funding as a mechanism for the promotion of research. But the Law also had some provisions for “OPIS”. The Law created a “legal status” of OPIS (*Organismos Públicos de Investigación*) and recognized that some of the PRC, with very diverse Ministerial dependence, had that

legal status: CSIC, CIEMAT, IGME, IEO, INIA and INTA. Later on, the ISC3, created in 1986 by the Law 14/86, joined the club¹.

The institutional and organisational reforms were proposed to change the research centres and their working conditions. Changes in their R&D environment were also the consequence of specifically designed policies aimed at re-organising state intervention in favour of R&D and, later, the changes in the economic aspects of public research activity.

The Science Law gave rise to a system of scientific policy designed around a National Plan for R&D, under the inter-ministerial management: the CICYT. This law defined new rules, institutions and organisations in the field of scientific and technological policy. The R&D environment changed thanks to the pressure to align the research agendas of the universities and R&D centres with social and economic requirements by means of “prioritised research”, the “eligibility for research funds” as the basic mechanism of financial support and the promotion of incentives to increase “external funding”, whether public (coming from a national, sectoral, regional or European programmes) or private (by means of contracts with companies for joint R&D programmes or the provision of scientific and technical services) (Sanz-Menéndez, et al., 1993; Sanz-Menéndez, 1995 a, b).

In the Science Law, the public R&D centres were still envisaged as instruments of the State and reforms were therefore drawn up by which they were defined as the means for co-ordinating R&D. The regulations affecting the public research centres were designed to homogenise situations and provide them with flexibility in order to improve their alignment with the national priorities of the plan. The Law identified 6 Public Research Centres (PRCs) (CSIC, CIEMAT, IGME, INTA, IEO, INIA) under direct ministerial control which were declared subjected to a number of common organisational principles and actions. The most important regulations affected the economic management, the flexibility to contract non-civil service researchers and the possibility for creating new economic incentives: a) The six PRCs (other institutions were included later on) were recognised as “autonomous commercial organisations”, though they maintained their affiliation with their tutelary Ministry; this allowed them to obtain external funding (and use this built-up budget credit) both from competitive state or European funds and by the signing of agreements or contracts with companies. The Law made the PRCs more flexible in their ability to adapt to change, clearly opening the door to the diversification of the sources of research funding. b) Furthermore, they were provided with mechanisms by which to contract researchers to carry out R&D projects (later subjected to authorisation in number and cost by the Ministries of Public Administration and of Economy and the Treasury); c) The Law, in article 18.2, also approved the possibility (subject to later regulation by the Ministries of Economy and the Treasury and of Public Administration) that a proportion of the commercial income derived from contracts signed with public or private enterprises for scientific work or technical assessment, could be transferred to individual researchers in the form of productivity bonuses; in this way, the door was opened to a system of individual incentives in these research centres which were

¹ These were: the Consejo Superior de Investigaciones Científicas (CSIC), el Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT), the Instituto Geológico y Minero de España (IGME), the Instituto Nacional de Tecnología Aeroespacial (INTA), the Instituto Español de Oceanografía (IEO) y the Instituto Nacional de Investigaciones Agrarias (INIA). Apart from these six cases, later on, the Instituto de Salud Carlos III (ISCIII), the Centro de Estudios y Experimentación de Obras Públicas (CEDEX), and the Canal de Experiencias Hidrodinámicas del Pardo (CEHIPAR) were recognised. (See Annex I and II for the most important PCR that have the OPI status).

working within the public framework. The new regulations increased the number of possible responses for management and researchers within the R&D organisations (Alonso, Fernández and Sanz-Menéndez, 2001).

However, in terms their civil servant staff, only some of the centres increased their numbers. CSIC gave the tenure status to most of 800 new researchers between 1985 and 1990. The INTA had also some “golden years”, especially in budget terms between 1989 and 1992 when a Spanish micro satellite launcher was developed. The fate of the different public research centres was in fact very dependent of the interests of the Minister on charge and the attributed relevance of research for the Ministry business (Sanz Menéndez and Cruz Castro, 2001, 2003). The CSIC at the time was under the Ministry of Education and Science at a time in which the Universities, historically owned by the central government, started to be transferred to the control of the different regional governments; in fact for some officials, the CSIC appeared as the only instrument to influence directly the research, and the university behaviour in this field through the creation of mixed institutes and competition for resources.

The issue was relevant because the Law of Science consolidated the ownership of the central government over the OPIS, while the Regional governments, especially Catalonia, were demanding their transfer to the regional authorities. However, a Constitutional rule in 1989 gave the Central government the possibility to own PRCs with research institutes allocated in the different regions, and to the regional Governments the right to set up their own Research Centres.

The R&D system and the research actors at the end of the 20th century.

In the last decades, the Spanish research system has been sharply transformed. From being research an activity almost exclusively confined to the public government sector, today most of the research activities are carried out at firms and universities. The number of research actors has grown exponentially, the internal diversity between them has increased, and the types of knowledge produced have diversified.

Traditional R&D statistics provide us with a clear idea of the changes. In the mid- sixties the proportion of the Spanish Gross Domestic Expenditure on R&D (GERD) performed at the government sector was 68%, in business enterprises 25%, and at universities 6.5%. It has to be remembered that at the time the GERD represented about 0.4% of the GDP. In 1998, the Spanish effort in R&D grew up to 0.9% of the GDP, and the distribution between sectors changed dramatically. Business enterprises represented 52.1% of the total, universities 30.5%, private non-profit 1.1%, and government sector 16.3% of the total GERD (INE, 2000). Thus, the statistics give us a balance of the main changes: the relevance of the research developed in public research centres under the government sector has decreased dramatically and at the same time universities have become the most intense source of growth in the system.

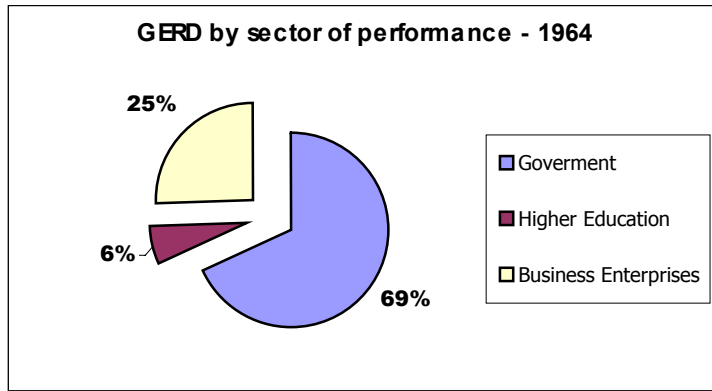


Figure 1: GERD by sector of performance in 1964. Source: INE (2000).

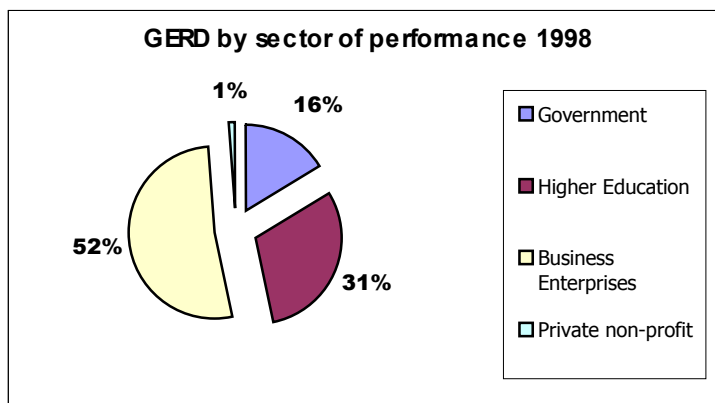


Figure 2: GERD by sector of performance in 1998. Source: INE (2000)

Today, the business enterprises sector is, in terms of GERD, the main performer of research in Spain and it accounts for more than 52% of the total GERD. However, it is at the higher education sector where we find most of Spanish researchers, because universities account for 55 % of the Spanish researchers at FTE.

The number of firms, in 1999, that developed R&D was about 2,747, a number that had grown from the amount of 523 in 1982. In the other side, the number of Universities grew significantly too. At the time of the transition to democracy, in 1978, the number of Spanish Universities was 23; at the time 4 private universities, under church institutions, increased this number. In 1985 the number of public universities was 35. In the nineties, after the approval of a new regulation, private universities started to flourish. In 2000 we had 48 public universities and 15 private ones.

Under the heading of private non-profit sector we encounter professional associations, charities, cultural societies, unions, consumers associations, foundations among others², that in fact represent a minor amount, in the total GERD and the number of actors was 65 in 1999. At the same time this sector is quite significant in terms of its evolution because most of the new initiatives of creating or reshaping

² This is the official definition of the Spanish Statistical Office (*Instituto Nacional de Estadística*), however private non-profit organisations instrumental of the government, business sector or universities usually are incorporated into the owner sector in the official statistics.

research centres usually moves into the foundation or private non-profit institutions forms, due to their “flexibility to operate, even when most of the money they use for their activities comes from governmental sources. In fact they account for most of the new developments.

The other sector of R&D performing institutions is Government, which includes centres or government bodies either from central or regional and local governments. However the big player is the central government, which owns the biggest research institutions of the country. Regional governments are new comers that in some areas received the transfer of centres’ ownership from the National government, such as agriculture, and in other areas created their own centres, mostly with new legal types.

Official statistics report that, in 1999, there were 182 government PRC that somehow performed R&D activities; 64 owned by the Central Government and 118 by other public administrations. However approximately 50 % were Hospitals. The big part of this sector, in terms of staff, was a specific group of Public Research Centres (PRC) that have a common “normative environment” created by the Law of Science (Law 13/86), the so call Public Research Bodies (*Organismos Públicos de Investigación* (OPI).

The new actors and the search for the “flexibility”. Blurring the boundaries in a new R&D environment.

In the context of a strong growth of University personnel, the PRCs have lost ground, more so if we take into account the sharp decline in public sector's employment, that affected them over the nineties.

We can summarize the basic trends developed in the environment of R&D institutions, and especially in what related to RCs, as follows:

a) The Law of Science allowed for the implementation of conscious efforts for the homogenisation and standardization of the big public research centres (OPIs), however with a slow path of development.

b) A trend of emergence and consolidation of new actors in a diffuse boundary between public and private, mostly taking non-business forms (NFPO). In some regions, it was the historical form of the so called “*asociaciones de investigación*”, private non-profit institutions, providing collective technical services to SMEs, while in others it was the result of some individuals (university professors, leaders of “professional” associations, mostly with engineering background) building Technical Research Centres (*Centros Tecnológicos- TC*), for supplying new knowledge to the SME or very specialised technical services to the big companies. In two regions, Basque Country and Valencia, these private non for profit institutions have consolidated as knowledge distributors.

c) Increasing involvement of the regional Governments, either in supporting “private industrial and technical research centres”, performing the role of “collective infrastructures”, or promoting institutions and organisations that could implement research directly and owned by the Regional Government.

As a result of these dynamics, today’s environment of the non university RC has become much more complex than it was some decades ago, with new actors and with a much more limited role of the central government as the main player in this domain.

The increased availability of “competitive funding”, either at European, national or at the regional levels, both for public and private sector, has created a good environment for launching initiatives such as the promotion of new independent research centres initiatives. The new organisations and institutions that emerged in the last years were born as a result of initiatives from different actors:

a) The big public Research centres, the Regional Governments and even the Universities have played a role of promoters of new initiatives using the legal formula of “private foundations or non-for-profit organisations” as main instruments for gaining flexibility, in terms of budget and administrative management, and in term of labour relations, wages and contractual issues. The emptiness of the “Foundation formula” in the Spanish legislation allowed for the creation of “instrumental” institutions, that of course could earn money and own resources, but which had no “administrative or bureaucratic” constraints.

b) In the other side, some individuals, academic or social leaders, have taken the responsibility of setting up new centres, under the umbrella of private non-profit initiatives, and in many cases the individuals acting as private promoters have searched for the support of the governments.

In a way, the evolution of the public sector and the initiatives from the private side developed in parallel, by using the same type of organisational forms, that allowed public sector a lot of flexibility in comparison with the administrative environment.

2. The institutional setting for the centres in the database: a typology of organisational structures.

The analysis that follows refers to the groups of research centres included in the Spanish database. The Spanish Subset of the database has 90 records and from each one we will analyse information on their origins, legal form, ownership, sources of funding, number of staff, knowledge areas, main output of their activities, and relationships or links with their environments.

To give some insight of the representativeness of the database we could compare with composition of the sectors in the official statistic of Spanish R&D (INE, 2001): 2,747 were performing some R&D; the figure for universities was 63 (48 public and 15 private); the government sector had 182 PRC, more than 50% being Hospitals (not included our database) and finally 65 non-for profit organisations (NFPO). Then our database includes almost all relevant PRC in terms of size and most of the NFPO performing R&D.

The population of study is the “public, semi-public or recently privatised research centres”. We have not included any research centres directly owned by a “business enterprise” or by a “university” alone. However we could find some ambiguities in the boundaries as some research centres, that have the form of a private firm (no matter that it could work on a non-for-profit basis) or some research centres that have a mix nature, involving universities; some of these cases have been included. The research centres included here have “legal independent personality”, thus they are not controlled (or are instrumental only) by others. We have also included some cases a third type of “soft” research centres, that emerge as the result of the agreements between institutions for developing joint research activities (they

are regulated by “collaboration agreements”), such as “mix units” or “differentiated parts” of the parent organisations.

The Age of the Groups as an indicator of the ecological dynamics of the RC.

The PRC group, 19 in total, represents 21% of the total database, but inside this group we have two sub-groups: in one side the OPIs, with a total of 9, and in the other the rest of the PRC.

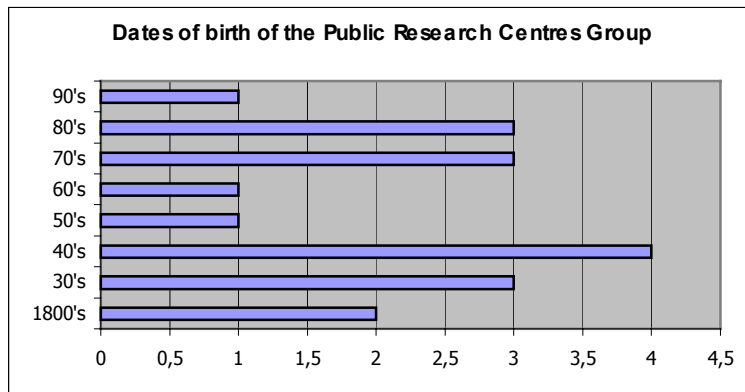


Figure 3: Dates of birth of the Public Research Centres Group.

Source: Spanish ‘EUROLABS’ PROJECT database. (N = 19).

As we had anticipated, the non for profit organisations emerged as the form mostly used to create new research centres.

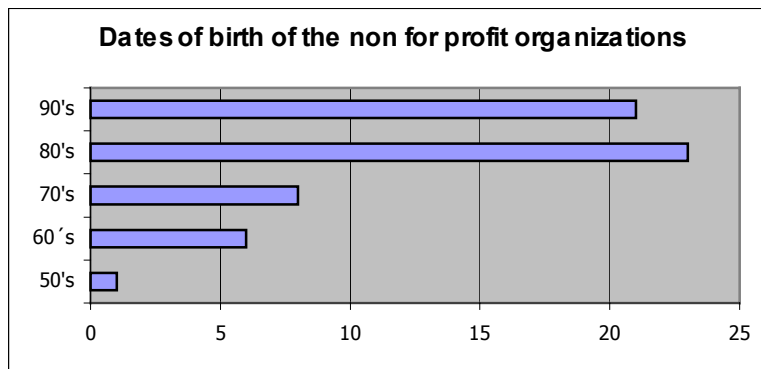


Figure 4: Dates of birth of the Non for Profit Organizations Group.

Source: Spanish ‘EUROLABS’ PROJECT database. (N = 60).

Thus the non for profit organisations (NFPO) have been created mostly in the eighties and the nineties. This legal form has been promoted either by the government or universities or the private sector. Each of them has very diverse motivations, but the result is similar. The legal frame is the Law 30/1994, 24 november, de *Fundaciones y de incentivos fiscales a la participación privada en actividades de interés general*. The Law aimed to promote private initiatives in support of the

general interest, because governments couldn't cover all the demand. The Law also regulated the constitution of this type of Foundations by the public sector.

Ownership and legal status

The constructed population of Research Centres includes up to 90 cases. The ownership (an indicator of legal status) of those units is distributed as we can observe in the figure below.

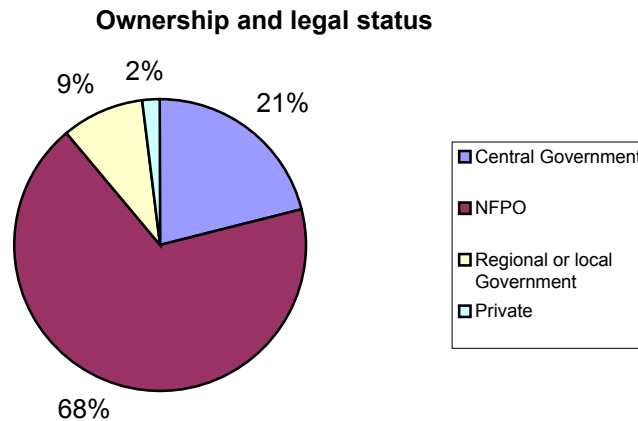


Figure 5: Ownership and legal status.

Source: 'EUROLABS' PROJECT database. Spanish sample (N=90)

The biggest population in our database is the group of “non for profit organisations” (NFPO) that represents 68% of our population of RC. However as it was mentioned, this legal form has been adopted either by public or privately-owned research centres. The second biggest group in numbers is the collective of “public research centres” owned by the “central government that represents 21% of the total. Centres owned by the private sector included in the database represents 2%, while the research centres directly owned either by local or regional Governments are 9% of the total; however, as we had mentioned, many private non-for-profit centres were the outcome of different impulses or efforts from regional governments to promote or launch industrial sectors.

When we consider the size of the different groups or populations, we should mention that the biggest RC in size (either counted in budget, employees or number of researchers) is the “central government owned one” that represents more than 75 % in terms of total annual budgets, and almost 80% in terms of the number of the total staff the group. More precisely, the biggest RC in Spain, that has been taken as a single organisation, is the CSIC that represents 38% of the total staff employed in the RC of our database, and the 29% of the total budgets of the RC. This skew distribution of the weights should be taken into account.

The main purpose of the analysis that follows in to compare the patterns that the 4 types of RC identified in terms of ownership or legal status follow in relation to different variables. However, due to analytical and methodological reasons (especially consistency of the small data in some types) the descriptive analysis is focused on the two most numerous groups: “non for profit organisations” and “centres owned by government”.

The Origins or the originators of the “non for profit organisations”.

As we have mentioned the biggest group in our population of RC is the “non for profit organisation”, that has a legal private status. However this form is used and it has many different origins. To understand the dynamics and the specific patterns of the population we should take into account the “origins”.

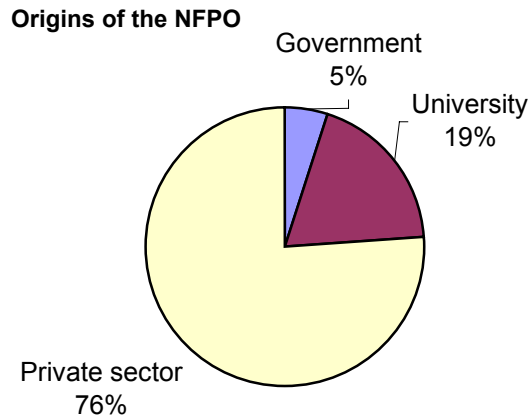


Figure 6: Origins of the Non for Profit Organizations Group.

Source: Spanish database. (N = 60)

The biggest share of the NFPO has its origins in the private sector: 76% is a group of Centres that are “research associations” or “technological centres”, which usually have a mission connected to some specific industrial areas. There are technology services providers, but they also perform technical assistances, specialised training to the firms of their sector; and they also perform tasks of normalization, certification and quality control. At the same time, it is also interesting to note that most of them (74%) have representatives from the Government on their governing boards, *Patronatos*, and most of them are under legal forms created by the Foundations Law of 1994.

These technological centres are the outcome of the R&D needs of some industrial sectors and the support of the public sector to the technological improvement of the industrial sector. Regional governments had played a main role in these organisations, supporting and financing these activities.

Some of them also originate from the government sector (5%) and are usually the result either of the attempts to exploit results of the research activities in the public sector, or of the attempts to develop regular activities in a more flexible way, outside of the public administration rules.

In the following, we are going to look at the four different types of organisations that we have identified in the Spanish database, and after having conducted some statistical tests, we are going to analyse whether or not we find intra-group homogeneity with respect to: funding, staff, research areas, links with the environment, and research outputs.

The patterns of the budgets and funding as features of the groups

It is important to note that in aggregate terms, the total budget of the PCR group is extremely much higher than that of the other three types of centres. Public Research Centres have total resources budget almost 10 times bigger than the NFPO.

Also our four types show significant differences with respect to this variable only if we consider the “government core funding” category. Government core funding is the basic source of income of PCRs (70% of total budget of cases included in this organisational type). It is also an important source of income of public-related non for profit organizations (NFPO): a third of their funding comes from there, whereas the figure is just 18% for private-related NFPOs, and practically inexistent in our few private cases. Private sector contracts account for half of the income of private-related NFPO, but the percentage is also high for public-related ones (38%) so differences between them with respect to this category are not significant. The same applies to public sector contracts as a source of income for both types of non-for profit organisations (11% and 15% are the corresponding figures).

This situation creates a very different pattern of funding of the selected groups in our population of RC:

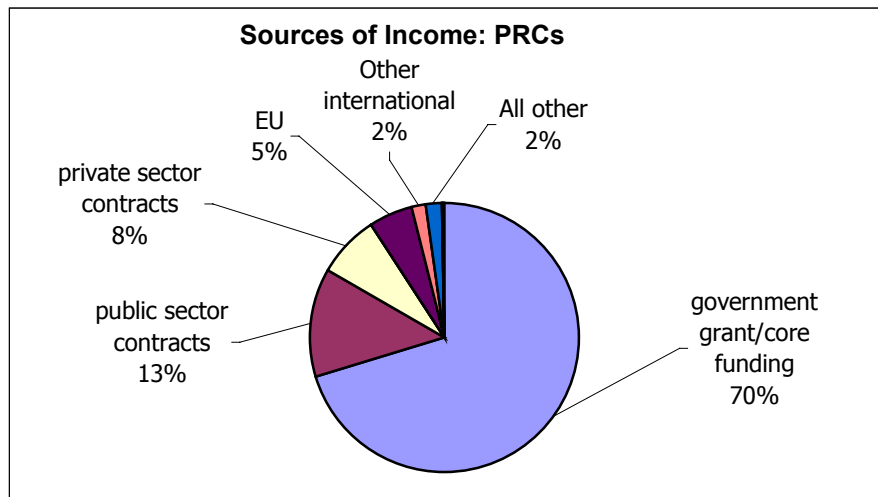


Figure 7: Sources of Income of the Public Research Centres Group.

Source: Spanish ‘EUROLABS’ PROJECT database. (N = 19).

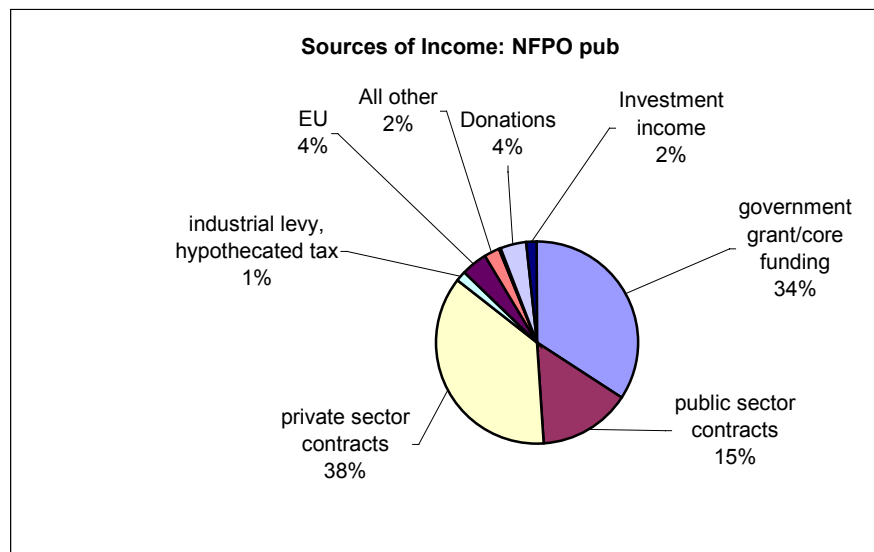


Figure 8: Sources of Income of the Public Non for Profit Organizations Group.

Source: Spanish 'EUROLABS' PROJECT database. (N = 60).

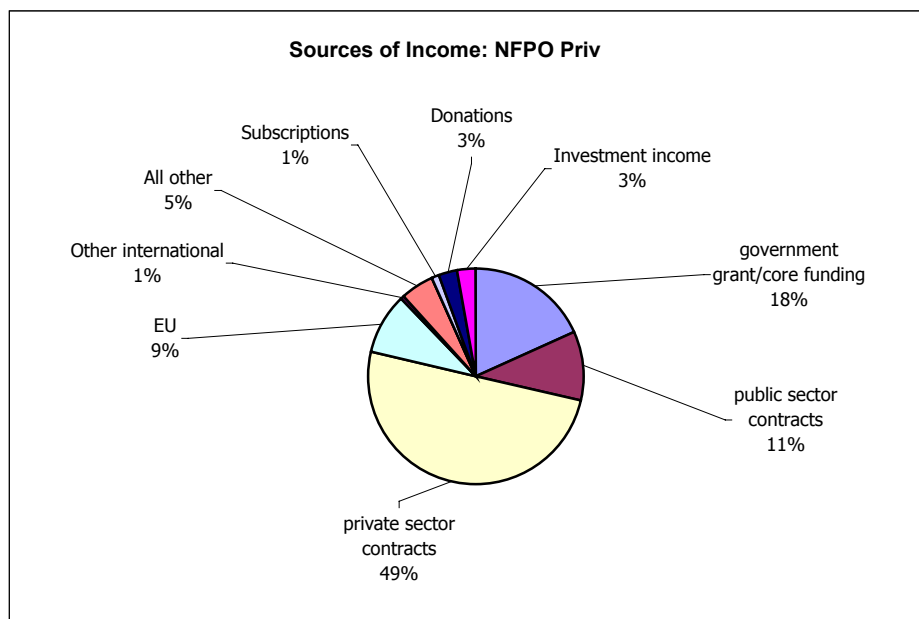


Figure 9: Sources of Income of the Private Non for Profit Organizations Group.

Source: Spanish 'EUROLABS' PROJECT database. (N = 60).

The size of the Research Centres as a critical feature

Here again, we need to point out that human resources are highly concentrated in our PCR group. If we consider the total number of staff as an indicator of the size of the centres, it is quite clear that public research centres in the Spanish database are larger than any other type of centre.

Turning to the different categories of personnel, the first thing to note is that we have treated them as exclusive, that is, on the one hand, “qualified research staff” has been considered to be the whole of research personnel with fixed job contracts or civil servant status. On the other hand, “temporary qualified staff” has been considered to be the whole group of research personnel with temporary job contracts. In this way, the variable “total number of staff” is the sum of qualified research staff, temporary research staff and doctoral students. If we compare the average values of qualified research staff among the different types of centres, we observe that they are highly represented in PCRs, but also in public-related NFPO. The same applies to doctoral students; we find them mostly in PCRs.

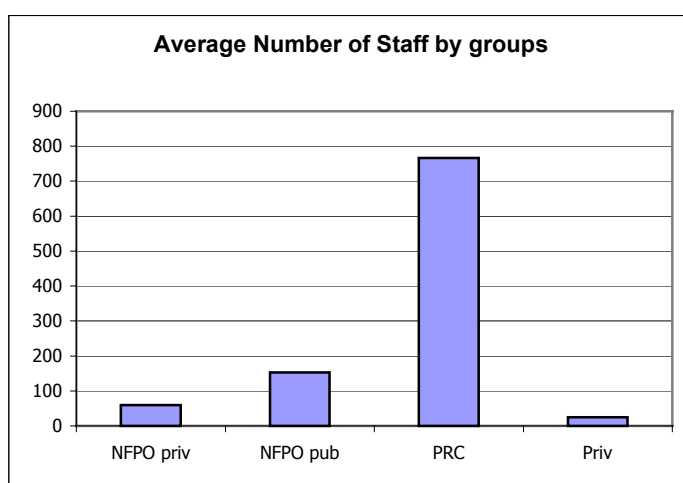


Figure 10: Average Number of Staff by Groups.

Source: Spanish ‘EUROLABS’ PROJECT database. (N = 90).

It is interesting to note how differences in the frequencies of temporary qualified research are not significant among our types. This partly supports the idea of the NFPO form of organisation in Spain as a mix space in between public and private in the search for flexibility. The high average of temporary research staff in PCRs could also reflect the impact of changes introduced by the 1986 Law of Science that provided them with mechanisms for hiring temporal research staff in the framework of their research projects and also of the inability of government to provide new permanent jobs for all those trained a few years before.

Research Areas of specialization

The statistical tests conducted show us that three research areas present significant differences among our cases’ groups: Natural Sciences, Engineering and Technology and Social Sciences. 36,6% of cases in the Spanish database conduct research in the Natural Sciences area; in fact 55% of all our PCR do some type of research in the Natural Sciences area. The percentage is also high in public-related NFPOs (42%) and much lower in the case of the private-related NFPO group (26%). Almost 69% of cases in the Spanish database answered that they conducted some type of research in the Engineering and Technology area. Eight out of every ten private-related NFPO do some research in this area. If we link this result with those of other variables, we have a very clear image of the type of centres we are dealing with: 81%

of them do “development”, 81% do “diffusion”, more than 60% do “certification”, and 80% do some research in the Engineering and Technology area. This gives us an organisational model very much oriented to industry and technical services, as we have also seen when from the analysis of links. 79% of Public-related NFPO also do some research in this area. Percentages are much lower for the PCR group. Finally, although it is not highly represented in the Spanish database (less than 10% of the cases), it is important to note that medical research is almost exclusively found in the public sector.

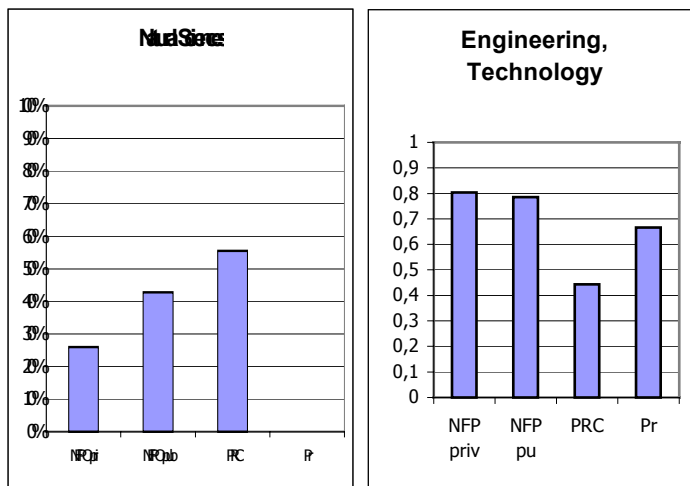


Figure 10 and 11: Research Centres’ Performing Research in Natural Sciences and Engineering & Technology by Group.

Source: Spanish ‘EUROLABS’ PROJECT database. (N = 90).

The external links of the organisations

Among the several potential links of all centres, it is just around three categories that we find significant differences among the types of centres; these are: industrial, national authorities, and academic links. Private related NFPO, most of them technological centres, do all have links with industry, and with a higher intensity; intensity of this links is much lower for PCRs.

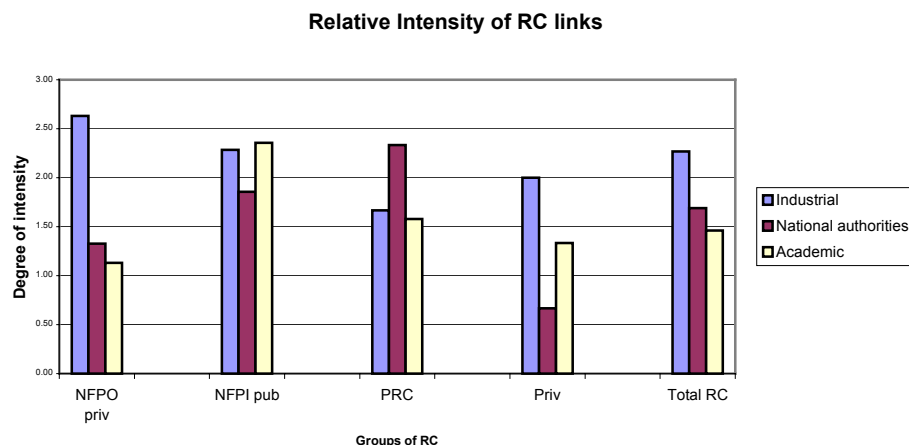


Figure 12: Relative Intensity of Research Centres Links by Groups.

Source: Spanish ‘EUROLABS’ PROJECT database. (N = 90).

As expected, links with national authorities are more intense for PRC and NFPO of public origins than for the NFPO with private origins. Academic links are stronger for public related NFPOs than for the rest, but they are also important in the case of the PCR group.

The type of Research and outputs of the centres’ activities

Our different types of centres in the database behave in a very different way with respect to the variable “research outputs”. It is the PRC group the one that shows a higher percentage of basic research. More specifically, more than 60% of PRCs have basic research as an output of their activities. Our group of non for profit foundations originated or with strong links with the public sector, shows a similar pattern. Differences are significant when we compare these two groups with the cases that fall under the headings of privately-originated non for profit foundations, and under private, of which only 20% and 30% of the cases have basic research as an output. According to this, public or public related centres do basic research in a significantly greater extent than private ones.

In contrast, applied research is not an output around which our types differ significantly. In other words, the centres in our database do have this output in a quite homogeneously high frequency. The same applies with respect to “development” and “diffusion”. The second category of outputs in which our types differ, is, “certification” which shows an opposite image if we compare it with “basic research”; in this case, it is private-linked non for profit foundations and our few private cases the ones that show a significantly higher frequency (close or over 60% of the cases do have that output) whereas the frequencies in the other two types of centres are much lower.

Final remarks

As we have observed from our data we could confirm the hypothesis that we presented at the end of the first section:

Public Research Centres have developed adaptive dynamics searching for more flexible organisations that allow them to manage their human and financial resources with less administrative constraints. The main way of escaping has been the promotion of new private foundations publicly controlled, allowed by the Law of Foundations of 1994.

On the other hand, the private initiatives, most of the time under the umbrella of non for profit organisations have tried to involve public powers into their support. The political power is a way of reducing uncertainty and many of them have agreed to accept a permanent relationship with the public sector.

Taking into account these two trends, it seems that a common space, in which boundaries become blurred, has emerged in which RC, especially the new created ones are semi-public entities. Mixed or “mestizo” institutions become dominant, some of them came from the public sector while other had developed strategic alliances with the public authorities. It looks like this new type has much more adaptive capabilities in the new R&D environment.

3. Recent policy initiatives and reviews and future plans

The aim of this section is to present an overview of the major policy initiatives and reviews that have taken place in recent years and also of the plans and proposals that are currently being discussed, paying attention to those that affect the status of the research centres, such as the ones that involve changes about staff tenure and status, intellectual property, conditions to commercialise their knowledge, etc.

In the early nineties, the OPIs had important pressures in term of their budgets; those pressures were an incentive to search for external funding, as the reforms aimed. Very few new permanent positions at the CSIC were approved in those years, and as a result the CSIC had less and less permanent research staff every year. The University was for most of the socialist ministers the ideal place for research in the public sector. Interestingly enough, since the Conservative party entered into office in May 1996, the Government approved the “reinforced co-ordination and the integration of all the sectoral Public Research Centres (OPIS), still under diverse Ministries, and their merge under the CSIC umbrella in the following six months. However, resistance of the vested interests and the difficulties of advancing into a merge produced the failure of the proposal. After that, another attempt to increase the co-ordination of the OPIS reappeared with the creation of a “functional co-ordination Committee” among OPIS (R D 574/1997, april 18th); once again, this effort was not very successful in practical terms, because no normative effects in providing more coherence to the OPIS emerged. Nonetheless, the preferences of the conservative government on the issue of PRC started to be clear.

With the new government, the S&T policy received a new impulse, and the OPIS, especially the CSIC benefit from them, getting more new permanent research positions. The government also started to use the rhetoric of bringing the leading Spanish scientist working abroad back to Spain. As a result, the Ministry of Health and Consumer Affairs, through the Health Institute Carlos III, constituted two “private non for profit foundations” as legal forms to set up the new public research centres in “cancer and heart research”. The new “Fundación del Centro Nacional de Investigaciones Oncologicas Carlos III (CNIO)” has now a very significant budget, almost a third of its parent organisation, the ISCIII. The research director (Mariano Barbacid, formerdirector of one the US NIH Institutes) recruited researchers from all over the world with a non civil servant status, with much better wages, etc. There is

another on-going centre “Fundación del Centro de Investigaciones Cardiovasculares Carlos III”.

Thus even within the Government, there is the a consensus on the fact that many times the public administration structure is not the best one to manage high quality research in a flexible and internationally competitive way. CNIO has also a board in which representatives from the private industry sponsor some of their activities.

But it was after the elections of March 2000, when the Conservatives won again, that big movements in the sector of the State-owned research centres started. The new government established, at the end of April 2000, for the first time in Spanish history, a Ministry of Science and Technology. Under the vice ministry of Scientific and Technology Policy, a General Secretariat for Science Policy (*Secretaria general de Política Científica*) was created with the task of coordinating the OPIS, of which five were transferred to the supervision of the new Ministry (CSIC, CIEMAT, INIA, IEO, IGME). The new unit has competences to coordinate, homogenise, etc. the 5 different organisations, and to take initiatives. Among the big OPIS, only ISCII and INTA continued on Health and Defence Ministries. The competence on the IAC (being a mix centre) was also in the hands of the MCYT. A new, very active policy started to be developed, which appears to be driven by the idea of merging the OPIS into a gigantic CSIC.

Without any doubt, the allocation of the 5 OPIS (Consejo Superior de Investigaciones Científicas -CSIC-; Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas -CIEMAT-; Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria -INIA-; Instituto Español de Oceanografía -IEO- and Instituto Geológico y Minero de España -IGME-) at the Ministry of Science and Technology represents a clear improvement in the context of the Spanish Public Administration. For the first time, it allows for a single policy on research centres, for an improved use of the resources, and it promotes an increased rationality and efficiency. The unitary action over the OPIS could help to break the tradition of fragmentation, the emergence of contradictory initiatives and it could help to make better choices on the scarce resources available for experimental research.

There have been some initiatives and some reforms have been promoted along different lines: 1) The reform and homogenisation of the organisational structures of the OPIS; 2) The increase of their human resources; 3) The rationalisation of their personnel structures and categories; 4) The enlargement and flexibility of their activities, and 5) The optimisation of their resources.

1. The reform and normalisation of the organisational structures and governance system has been one of the first actions. New Statutes of Organisation and Functioning have been approved as a first step to the homogenisation of their functioning (coming from different ministerial traditions and local practices) and the promotion of their collaboration with Regional Governments, Universities and firms. The new Statutes –approved by Royal Decree RD 1945/2000, 1950/2000, 1951/2000, 1952/2000 and 1953/2000, published on December 1st. had as basic objectives: 1º) to adapt the composition of the OPIS government bodies (Consejos Rectores and Junta de Gobierno) to the creation of the Ministry of Science and Technology; 2º) to regulate, with homogeneity criteria, the functions of the directive and management boards of the OPIS; 3º) to accommodate the functioning and the legal regime of the OPIS to the approved Law on the Organisation and Functioning of the General Administration of the State (Law / 1997) and 4º) to introduce flexibility in the regular functioning of the OPIS.

In addition, a diffusion mechanism to the OPIS not in the MCYT has been improved and extended through the Committee on Functional Coordination of the Autonomous Organisms of Research and Experimentation (Comité de Coordinación Funcional de Organismos Autónomos de Investigación y Experimentación) (approved by Royal Decrees RD 1451/2000, of July 28 and 560/2001 of May 25. This reform has several objectives such as: 1º) To incorporate to the "Comité de Coordinación" some representatives of centres and Institutes that play a role in research (DG de Universidades, DG of the Instituto Geográfico Nacional, and Instituto Astrofísico de Canarias), but were not members of the Committee, and 2º) the incorporation of the Directives bodies of the MCYT to the Committee.

2. In order to increase the human resources of the OPIS, a "Five Year Program" has been established (2002-2006). In addition to replacement of the retired people an absolute increase of 2.170 permanent jobs of researchers and technical personnel will take place in the next years. There will be more civil servants but also more temporary jobs; for example 244 researchers and 486 technical staff for the CSIC; and some additional 200 researchers for the Regional centres in agriculture supported by INIA.

The trend is to increase the number of permanent positions at the OPIS in a significant way. As an example, during 2000, exams for 272 new researcher permanent positions were set up in the 5 OPIs, while the figure was 167 in 1999, and 132 in 1998. Additionally at the CSIC in 2001 exams were organised to cover some 149 new jobs through internal promotion of researchers, while in 1999 the number was 57 positions and in 2000, 82.

Also new efforts in the increase of technical staff for managing the scientific infrastructures of common use of universities and research centres have evolved, in 2001, with 150 new contracts as a result.

As a balance, the 5 Year Program (2002-2006) will produce a significant increase of the permanent positions of researchers and technical staff people in the OPIS of the MCYT. The Program will bring 613 new positions. It is expected that at the end of the 5 year period 3.065 new civil servants (2.170 new positions and 895 corresponding to the reposition of vacant positions) will join the OPIs.

3. In what refers to the personnel structures, the OPIS had completely independent and diverse professional groups, created by their Ministries of origin. Only CSIC had a clear typology and a stable career scale with 3 types of research status (Professor of research; Researcher; and Scientist). Then the attempt is to create a common and simplified structure of reference for the professional scales of people working in all OPIS.

The first step in this matter has been the creation of "Unified scales of Research scientists and Specialist Technicians" in the OPIS of the MCYT (approved by the art. 35 of the Law 14/2000 of December 29th and developed by Royal Decree RD 868/2001, July 20th, that will allow for the incorporation of 388 people to these unified scales: 307 civil servants to the Scale of Research Scientists (Escala de Investigadores Titulares) and 81 to the Specialist Technicians (Escala de Técnicos Superiores Especialistas)

In addition, new contractual forms –up to 5 years- have been approved (D.A. Seven of the Law 12/2001, July 9th, Medidas Urgentes de Reforma del Mercado de Trabajo, modifying the art. 17 of the Law 13/1986 of Science), to the help the process of incorporation of doctors to the Spanish system of science and technology, with an explicit mention of the evaluation of the performance of the people under these contracts.

This year there is a plan for the creation of the unified scales of “Técnicos Especialistas de Grado Medio, de Ayudantes de Investigación, y de Auxiliares de Investigación” in the OPIs under the MCYT. Very diverse scales will be incorporated with a significant number of civil servants (Escala de Técnicos Especialistas de Grado Medio, 623; Escala de Ayudantes de Investigación, 843; Escala de Auxiliares de Investigación, 207).

In summary, there are many initiatives in the field of labour relations and professional development to provide the 5 OPIs under the MCYT with more coherence. 4. The extension and increased flexibility of the OPIS activities are also issues for action. An example is the change of the limits for establishing “Collaboration agreements” with universities, firms and other research centres. A further example is the change of the somehow useless legal system for the creation of “spin-offs”, and the plans to solve the lack of a specific regulation on the exploitation of the inventions and its diffusion and transfer to the firm sector. Currently, there is no room in the present legislation to allow scientists from the PRC to participate in the “spin-off” resulting from their inventive action. Actions are demanded to help in the temporary exchange of research and technical personal, or the shared use of equipment and facilities. Initiatives are being taken to regulate the exploitation of the research results and the lending of the property rights:

At the end of 2001 it is planned to pass a new change in the art. 15 of the Law of Science, allowing OPIS to make “Collaboration Agreements” with regional Governments, Universities and non for profit foundations to develop different activities such as: a) research and innovation projects b) Knowledge and scientific results transfer; c) creation, management and funding research centres or units; d) training of specialists; e) shared use of equipment or facilities, and f) temporary exchange of personnel for scientific or technical activities. They will also be able to develop, collaboration with firms to do a), b), c) and d) in a more stable environment.

The article 19 of the law of Science will also be changed: 1) To extend the possibility of creation or participation of the OPIS in for profit enterprises, in activities of R&D, technical services, exploitation of patents, and use of innovation and transfer of results. 2) To facilitate the temporary (up to 4 years) incorporation of civil servant researchers into these enterprises, providing them with the right to return to their original jobs after the period.

A new regulation by a Royal Decree will be approved on the “exploitation and lending inventions produced at the OPIS”, and it will be about: 1º) ownerships of the inventions; 2º) obligations of the OPI and the researcher; 3º) distribution of the benefit of the patent; and 4º) a special regime for the inventions resulting from contracts or collaboration agreements.

5. The OPIS have received new functions related to the overall National system of innovation and an overall strategy to increase their own capability of decision-making and management to increase flexibility of their resources is pursued.

6. Some other actions, also of application to university researchers, have been taken for the first time with the aim of creating individual incentives for researchers. They involve the increases of wages of the people working in PRC. In the 2001 bid for research project funding, a provision has been established to allow to use the public funding coming from the National R&D Plan to pay increases of civil servants’ wages, all as rewards of the most prominent researchers.

In summary, there is a lot of activity, normative and regulatory, on the OPIS; and it appears that the final objective is the unification of all of them. A Law is expected to support this radical change, but it needs the previous development of

homogenisation and preparatory measures. All these political initiatives occur at the time that most of the OPIS, especially CSIC, have been able to develop strong adaptive responses to the changes and to develop strategies to get more and more external funding.

At the same time that these initiatives are taken to smooth the functioning of the PRC, some of them continue to develop a strategy mostly based on the creation of private non-for profit organisations controlled by the government.

In the other side, there is also a process of consolidation of a population of “independent non for profit institutions” developed by private actors, providers of collective technical knowledge and research services to the private firms. This group of centres also has become a lobby and it is searching for a very fluid connection with the political system, either to get funding or for reducing uncertainty.

What it appears for the next years is a more complex system of RC, with more variety, but with clusters of actors sharing features and properties.

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Annex 1: Major Spanish Public Research Centres (PRCs)

Acronym	English literal translation	Year of creation	Total Staff	Most relevant Areas of Scientific and Technical expertise	Similar organisations in France, Germany, U. K., Italy
CSIC	Higher Council for Scientific Research	1939	9.630	All kinds of basic and applied research	CNRS, MPG, ---, CNR
CIEMAT	Centre for Energy, Environmental and Technological Research	1948	1.226	Energy, nuclear, environment	CEA, KfK, UKAEA, ENEA
IGME	Spanish Institute for Geomining Technology "Esteban Terradas"	1859	400	Geology, Mining	BRGM, BfGR, BGS/NERC, SGI
INTA	National Institute for Aerospace Technology	1942	1.288	Aeronautic, space, electronic, communications,	CERT-ONERA, DLR, DERA, CIRA
INIA	National Institute for Agriculture and Food Research and Technology	1971	530	animal health, forestry, agriculture food, fito & zoo-genetic resources	INRA, FAL/IPK, BBSRC, ISC/ISZA
IEO	Spanish Institute for Oceanography	1942	398	Oceanography, fisheries, aquaculture, marine environment	IFREMER, BfF, DFR, --
ISCIII	"Carlos III" Health Institute	1986	839	Health and Biomedical Research	INSERM, GSF, MRC/NIMR, ISTISAN
CEDEX	Centre for Public Works Studies and Experimentation	1957	735	materials, public works hydrography environment	LCPCCh, BAST, TRLL, ISMES

Annex 2. Some variables of major Spanish PRCs

Acronym	Administrative budget of PRCs, 2000 (Millions Ptas)	Percentage of 'external' funding 1996 - 1998	Main Sources of external Funding (ordered by relevance in 1996 or 1997)
CSIC	43.564	48 %	National R&D Plan (40%) Framework R&D Programme (28%) Firm's contracts (17%)
CIEMAT	8.631	30 %	EURATOM Framework R&D Programme (34%) Firm's contracts (31%)
IGME	3.729	8%	Agreements with Public Sector Programa Sectorial Agricultura (31%) National R&D Plan (12%)
INIA	7.517 (*)	21%	Agreements with Public Sector (26%) UE Funds (17%) Firm's contracts (8%)
IEO	4.946	12%	Framework R&D Programme (40%) Fishing Secretariat (40%) Firm's contracts (30%)
INTA	14.695	23 %	Agreements with Public Sector (35%) EU Funds (8%) Other international Funds (25%)
ISCIII	13.280 (**)	7 % (***)	National R&D Plan (21%) Framework R&D Programme (18%)
CEDEX	5.499	5 % (****)	Agreements with Public Sector Framework R&D Programme

(*) Includes various programmes and a strategic actions of the National Plan for R&D&I (2000-2003), under the control of the INIA, and which totals about 1,500 million pesetas, offered through open invitation to bids for which the researchers of the INIA make compete.

(**) Includes the Health Research Fund (FIS) budget which is of about 5,000 million pesetas; since 2000, the researchers of the ISCIII can no longer compete for this.

(***) The proportion has been calculated after subtracting the FIS for which the researchers of the Carlos III Health Institute cannot now compete though, prior to the prohibition, the FIS funds represented 40% of the "external funding" of the ISCIII.

(****) To estimate the quantity of the CEDEX, only those budgets which appear specifically as R&D have been included; these, as has been stated, represent less than 20% of the total.

(€1 euro = 166.386 Ptas)