ORGANIZATIONAL AND FUNCTIONAL DILEMMAS IN LARGE PUBLIC RESEARCH CENTERS: The Spanish National Research Council CSIC

Manuel Fernández-Esquinas
Jesús Sebastián
Javier López-Facal
Enrique Tortosa-Martorell
ORGANIZATIONAL AND FUNCTIONAL DILEMNAS IN LARGE PUBLIC RESEARCH CENTRES:
THE SPANISH NATIONAL RESEARCH COUNCIL-CSIC

Manuel Fernández-Esquinas, IESA
Jesús Sebastián-Audina, CINDOC
Javier López-Facal, Vice-Presidency for Research
Enrique Tortosa-Martorell, INGENIO
BASIC FACTS ABOUT THE CSIC

- Founded in 1939
  (Pre-Civil War organization: JAE - “Commission for the Advancement of Higher Learning” - Founded in 1907)

- Largest research organization in Spain. Covers almost all disciplines

- More than 10,000 people
  - 3200 tenured researchers
  - 3800 graduate and postdoc’s
  - 3600 technical and support staff

- 126 institutes/ 144 units in partnership with universities

- 19% of SCI publications / 47% of public-sector patents
**Research topic:** explanation of change in large public research organizations → the CSIC as a significant case

**Relevance of the problem:** refinements of general frameworks for R&D trends of change → Mode 2, Triple Helix

**Analytical strategy:** combination of new institutional sociology with the ongoing debate on changing R&D systems

**Organizational change is affected by:**
- Rules and legitimacy (institutional factors)
- Distribution of power and economic resources (structural factors)
TABLE OF CONTENTS OF THE PAPER

- Introduction. Institutional change in R&D organizations
- The early years: political and organizational restraints
- The 1970’s: democratization and social change
- The 1980’s: a political push to R&D
- The evolution of research fields
- Organizational arrangements in the 1990’s: The emergence of the ‘spontaneous model’
- The unintended consequences of Spanish science policy
- Current organizational and functional dilemmas
- The 2000’s re-structuration process: a new twist?
POLITICAL AND ORGANIZATIONAL RESTRAINTS FROM THE EARLY YEARS

- Foundational Act: Multiple goals at different levels
  - National science policy
  - Coordination – funding
  - Research → the only one really implemented

- Unique situation in Spanish public administration: “Autonomous burocracy”

- Organizational branches with distinctive missions

- Development of 3 research cultures
  - SS and Humanities: research branch of university
  - Technical areas: oriented to industrial needs
  - Experimental areas: basic science
AUTHORITY AND FUNDING STRUCTURE AT THE CSIC UNTIL THE 70s

- **Authority**
  - Hierarchical organization
  - Internal diversity (institutional goals and management procedures)
  - Specific translation of institutional goals (expectations about the outcomes to be produced by many institutes)

- **Funding**
  - ++ Public sector: direct funding $\rightarrow$ top-down distribution
  - + Industrial sectors: R&D taxes $\rightarrow$ top-down distribution
  - + Firms: research contracts $\rightarrow$ more flexibility at institute levels
AUTHORITY AND FUNDING STRUCTURE AT THE CSIC UNTIL THE 70s

Industry

Ministry for Education and Science

Competitive R&D Funds

Funding

Evaluation

R&D contracts

Taxes for R&D

Direct funding

CSIC: hierarchical internal branches

1. Technology institutes
2. Experimental institutes
3. Humanities institutes
THE 1970s: A DESORGANIZATION PERIOD

- Abolition of internal branches (1975)
- Democratization: new participation process at institute level (1977 Regulations regarding governance in the workplace)
- Abolition of taxes for R&D (1978)
- Economic crisis (1974-1979)
  - Lack of State funding
  - Losing of industrial strategic links
  
  → Conflict over control and resources
THE 1980s: A REORGANIZATION PERIOD

- **New political push to R&D**
  - Increasing economic support
  - New normative and political framework for science
  - New funding and evaluation agencies

- **Internal reorganization at the CSIC**
  - New revenues: for tenured Human Resources and Infrastructure
  - Reorganization of research areas
  - New rationale for CSIC-industry relationships: Office for Technology Transfer

- **New links with the environment**
  - Competition for funding (National R&D Plan)
  - New sources of legitimacy (funding and evaluation agencies)
AUTHORITY AND FUNDING STRUCTURE AT THE CSIC AFTER THE 80s

- **Authority**
  - Democratic organization
  - Internal homogeneity (institutional goals and management procedures)
  - Diffuse translation of institutional goals (production of certified knowledge)

- **Funding**
  - Public sector: direct funding only for wages and infrastructure
    - limited top-down distribution
  - Public sector: diverse and competitive funding (National R&D Plan, Regional Plans, EU Framework Programme)
    - bottom-up process
  - Firms: R&D contracts
    - bottom-up process
AUTHORITY AND FUNDING STRUCTURE AT THE CSIC AFTER THE 80s

Industry

CSIC

Ministry for Education and Science

Funding
Evaluation

R&D contracts

Direct funding: infrastructure + tenured HR

Competitive Funding: projects, scholarships

Regional R&D agencies

European FP

National R&D Plan
Evaluation agency/projects

Evaluation agency/ CVs(*)
SOME UNINTENDED CONSEQUENCES OF SCIENCE POLICY

- Rise of the ‘spontaneous model’ in the 90s: Economic crisis / Lack of planning and steering tools
- New rationale for resource allocation: only bottom-up procedures / scientific evaluations based on publications
- Funding agencies as reference players: researchers as ‘clients’ only / few strategic goals / no ex-post evaluation
- New rationale for internal authority: scientific merit
- Emergence of new legitimacy: ‘credibility circle’
- Taken-for-grantedness: socialization / formal rules for job allocations

Some side effects:
- Reorientation to basic science principles
- Industry collaboration as a non-planned and marginal duty
THE EVOLUTION OF RESEARCH AREAS

-Social Sciences and Humanities: university little science
   → Professionalization

-Tech​nical areas: applied research programs + R&D contracts + services
   → Convergence to the practices of basic science. R&D services as secondary activities

-Experimental areas: basic research projects + R&D contracts
   → Expansion. Prevailing working methods
### Table 3: CSIC Research Activity (1970-2005)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SCI articles</td>
<td>-</td>
<td>510</td>
<td>1321</td>
<td>4442</td>
<td>6720</td>
</tr>
<tr>
<td>Non SCI articles</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1108</td>
<td>1705</td>
</tr>
<tr>
<td>Articles in foreign journals</td>
<td>339</td>
<td>†831</td>
<td>2339</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Articles in national journals</td>
<td>1465</td>
<td>†2069</td>
<td>1315</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Books</td>
<td>237</td>
<td>235</td>
<td>-</td>
<td>-</td>
<td>360</td>
</tr>
<tr>
<td>Thesis</td>
<td>255</td>
<td>366</td>
<td>564</td>
<td>424</td>
<td>468</td>
</tr>
<tr>
<td>Patents</td>
<td>19</td>
<td>†36</td>
<td>-</td>
<td>96</td>
<td>153</td>
</tr>
</tbody>
</table>

Source: CSIC Annual Reports. Years 1970 to 2005. Source for SCI articles: CINDOC

- Non available
† Data from 1979
* Taken from Nieto, A. 1982
The situation in the 2000s: MAIN ORGANIZATIONAL DILEMMAS

Does the CSIC have a specific and distinctive goal?

Lack of steering. Risk of overlapping / redundancy with other research organizations

Homogeneous management in a heterogeneous organization

A National organization in a growing federal state

A new reorganization in the 2000s: The CSIC as a ‘public agency’
  More management flexibility
  New contract with the State → is it possible with the current organization system?
A summary of the process:

“FROM MODE 2 TO MODE 1....., AND BEYOND”

Implications:
- R&D systems can evolve in different ways depending on arrangements in organizational fields
- Organizational exchanges are not only a matter of economic and social impact of R&D
- R&D policies can have unintended consequences: legitimacy and the research communities adaptation are important factors
THANK YOU

WWW.CSIC.ES

www.iesaa.csic.es
www.cindoc.csic.es
www.ingenio.upv.es
www.redcti.csic.es

CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS
Table 1: CSIC Institutes and Human Resources (1970-2005)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutes</td>
<td>44</td>
<td>56</td>
<td>72</td>
<td>72</td>
<td>76</td>
</tr>
<tr>
<td>Joint institutes</td>
<td>-</td>
<td>10</td>
<td>21</td>
<td>37</td>
<td>40</td>
</tr>
<tr>
<td>Scientists</td>
<td>1448</td>
<td>1446</td>
<td>1777</td>
<td>2940</td>
<td>3202</td>
</tr>
<tr>
<td>Technical and admin</td>
<td>3150</td>
<td>3384</td>
<td>3750</td>
<td>4071</td>
<td>3626</td>
</tr>
<tr>
<td>Predoctoral and pos</td>
<td>-</td>
<td>372</td>
<td>*1618</td>
<td>*3781</td>
<td>*3802</td>
</tr>
<tr>
<td>Total</td>
<td>4595</td>
<td>5502</td>
<td>7145</td>
<td>10792</td>
<td>10630</td>
</tr>
</tbody>
</table>


- Non available
† Data from 1981
### CSIC FUNDING STRUCTURE

**Table 2: CSIC Funding Structure (1970-2005)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct public funding</td>
<td>86%</td>
<td>92%</td>
<td>78%</td>
<td>54%</td>
<td>67%</td>
</tr>
<tr>
<td>External funding</td>
<td>14%</td>
<td>8%</td>
<td>21%</td>
<td>46%</td>
<td>33%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>


- Non available
- † Data from 1993

R&D Programmes: competitive funds from National R&D Plan, Regional R&D Plans and European Union Programmes

Contracts: Contract research with firms and private entities