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**Changing paradigms and institutional models of  
science and technology policies in Argentina (1958-  
1983)**

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# Changing paradigms and institutional models of science and technology policies in Argentina (1958-1983).

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## 1. Introducción

The aim of this paper is to analyze the changes in paradigms and institutional models of S&T policies between 1958 and 1983 in Argentina, focusing on two public agencies in charge of these policies: the CONICET (National Council for Scientific Research, created in 1958) and the SECyT (Secretary of S&T, created in 1968)<sup>1</sup>. Consequently, two periods will be compared: the first one, whose paradigm may be understood as “liberal” or “human resources centered”, goes from 1958 to 1966; the second one, starting in 1966-67 and finishing in 1983, may be characterized as “technocratic” or “planned-orientated research”. Even if special attention will be paid to the second paradigm, dominated by the creation of the SECyT, the first period will be briefly described in order to show the changes.

The concept of "paradigm of S&T policy" used here involves three main aspects: a) the way in which various actors understand and appreciate the social function of science and the relationships between science, technology and society (or development); b) mechanisms for public intervention on research activities, that are considered as ‘legitimate’ by different actors; and c) the involvement of knowledge and conceptual innovations in the design of institutions and intervention instruments<sup>2</sup>.

Taking into account the conceptualization pointed out, this work will aim to assess the contradictions that emerged between the ideal dimensions that inspired new paradigms and institutional models, on one hand, and the correlation of forces among different local actors, on the other. The paper deals also with the question of what happens when new agencies of science policy are created, aiming at acting over a pre-existent and heterogeneous institutional scheme. Surely, some possible reconfiguration may occur: the coordination among institutions, the development of reinforcement strategies by the pre-existing institutions, or a hard struggle that can end up with the establishment of general and vague objectives in order to avoid conflict. All

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<sup>1</sup> This Secretary assumed various ranks and denominations throughout the period studied: SECONACyT, SECyT, SUBCyT. For readability, we refer here to the agency as "Secretary", or the abbreviation "SECyT".

<sup>2</sup> A similar concept has been formulated by Velho (2011).

these alternatives are analyzed here to show how the implementation of paradigms of science policy is mediated by institutions and other collective actors affected.

Additionally, it's important to stress that the process of conception and implementation of the second paradigm covers a long and complex period, which doesn't respect the periodization of the Argentine current historiography. Indeed, it is a period of deep political and social conflicts, marked by the alternation of democratic (1973-1976) and military (1966-1973 / 1976-1983) regimes and the succession of eleven presidents. In that context, the public agencies in charge of S&T policies were not the exception: in that same period, eleven secretaries took office in the SECyT, which was moved to different Ministries and institutional levels several times. The same can be said about CONICET, where the death of its historical president (the Nobel Prize Bernardo Houssay) opened the door to the succession of two presidents and three controllers. In 1973, the Council was intervened and passed from a direct dependency of the President to the Ministry of Education, together with SECyT. Thus, the continuity of a paradigm in this instable scenario needs a historical and conceptual explanation.

## **2. From 'liberal paradigm' to 'technocratic paradigm': a comparison**

During the military government installed between 1955 and 1958, the institutional bases that marked the development of the S&T sector were established. In this short period different institutions were created (or re-organized): the INTA (National Institute for Agricultural Technology), the INTI (National Institute for Industrial Technology), the CNEA (National Commission for Atomic Energy) and, overall, the CONICET (National Council for Scientific and Technical Research)<sup>3</sup>. At the same time, a modernization in the universities was promoted, through the departmental structure, the pedagogic reform, the creation of new careers and spaces for scientific research and, finally, the establishment of the full time positions, that enabled to associate teaching and research activities. The creation or re-foundation of these institutions implied the development of two contiguous S&T models, with diverse features, missions and sources of legitimacy: a) technological activities and socio-economic oriented research, specially anchored in sectorial institutions (INTI, INTA, CNEA) and legitimated by a public structure devoted to practical problems solving and the transfer of knowledge to productive or defense

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<sup>3</sup> Some of these institutions had been created during Perón's government (1946-1955), but in certain cases they did not get to work (as the National Research Council) and most of them were reformulated after 1955 (Feld, 2009 y 2012).

sectors; b) academic science, mainly based on Universities and CONICET and integrated –albeit in a peripheral way- within the international scientific community, which was the source of legitimacy, thematic orientations and organization forms (Vaccarezza, 1998).

Indeed, during its first ten years, CONICET strategy was oriented to promote the development and professionalization of research (especially in the universities) based upon three instruments: a) a fellowship program for young researchers, both inside the country and abroad; b) a grant program, to acquire scientific equipment, to hire foreign researchers, etc.; c) a ladder for scientific career, whose members could establish in diverse institutions (mainly in universities); d) a ladder for technical personnel, analogous to the latter.

Even if its creation decree considered the installation of institutes, labs and research centers into universities or other public or private institutions, until 1966 the CONICET privileged training and sustaining human resources, over the creation of new institutes. Consequently, only three institutes were created between 1962 and 1966, two of them with a mixed dependency –the National Center for Cosmic Radiation and the Argentinean Radio astronomy Institute- and one exclusively dependent of the Council (the National Institute of Pure and Applied Limnology in Santa Fe).

What was the extent of CONICET policies? Even if some its Board members aimed to establish an explicit S&T policy, able to coordinate the activities of several public research institutions, budgetary limitations confined the Council to more modest goals. While the international recommendations then said that the optimal investment was around 2%, between 1961 and 1966 the percentage of R&D investment in Argentina was an average of 0,31% of the GDP. Most of the funds spent in research (91,4%) had a public origin, with the following share: 20% went to decentralized organisms, 4,5% to Ministries and Secretaries; 75,5% to Universities (UNESCO, 1970: 42). Within this frame, CONICET had an average of 7,13% of the decentralized organisms and 5,35% of the resources devoted to public organisms (centralized and decentralized).

Therefore, CONICET strategy was oriented to the development of promotion instruments, rather based on excellence criteria than in social, geographical, or disciplinary objectives. Moreover, the resource distribution within each funding line (fellowships, grants, scientific and technician careers) was closely linked to interests and power forces in the Board (organized upon disciplinary representatives), to disciplinary requirements and to the existing demand structure.

That determined a strong concentration in Buenos Aires area and in biomedical research (with a long tradition in the country).

This arrangement has been seen, by some specialized literature, as the result of a certain consensus on the conception of the relations between science and society, or between science and innovation, in terms of a 'linear model'. However, several elements, such as the distribution of public resources among diverse S&T institutions (with a significant minor share received by the CONICET) question this interpretation. The relevance given by CONICET to grants and fellowships, as well as the establishment of a scientific ladder that complemented the creation of universities' full time position may be understood as the result of a general consensus on the need for a scientific 'critical mass' required by the country for its social and productive development. We do not deny the belief of several actors on the benefits that (in a mechanical way) the scientific development would provide, but we should point out that this 'linear' rhetoric, that dominated the postwar scene had diverse senses in different contexts, for instance, in USA and in Argentina. Indeed, in the latter, as some foreign researchers reports pointed out, the scientific infrastructure (both equipment and human resources) was very weak<sup>4</sup>.

The military coup in 1966 implied a breakdown of this science policy paradigm, whose first manifestation was the re-configuration of the prevailing institutional model. In 1968 the Government created the National Council of Science and Technology (CONACyT), integrated by the President of the Republic and several ministers and commandants in chief. The technical counterpart would be the Secretary of the National Council of Science and Technology (SECONACyT). This latter was in charge of: a) gathering and evaluating the backgrounds needed for the formulation of policies; b) analyzing and assessing programs and projects; c) proposing appropriate allocation and distribution of resources according to the objectives; d) coordinating its activities with the Secretaries of the National Council for Development (CONADE) and the National Council for Defense (CONASE) (Law 18.020, art. 5<sup>th</sup>). The aim was, in addition to establishing plans and priorities, the appropriate allocation of the budget among various institutions, regions, disciplines and research lines, and the establishment of uniform categories of research for researchers belonging to various organisms (Castex, 1988)<sup>5</sup>. Thus, the conception of

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<sup>4</sup> About CONICET during this period and the period before, see Feld (2009) y Feld (2012).

<sup>5</sup> This new model, based on a ministerial representation scheme and associated with planning agencies responded to the organizational schemes of the state bureaucracy characteristic of bureaucratic-authoritarian regimes, that is to say: the transfer of the model of the military organization (pyramidal structure) to the state apparatus, the importance

this new institutional model gave origin to a new set of S&T policies, or a new paradigm, some of whose main features kept constant until the early 1980s.

While the new paradigm had its origin partly in General Onganía's technocratic and authoritarian military government, it was also influenced by two contemporary processes: a) the emergence of critical ideas and debates regarding S&T policies, expressed both in the new rhetoric that acquired some local journals (such as *Ciencia e Investigación* and *Ciencia Nueva*), and in the creation of new institutional spaces for debates (such as the 'Transfer Program' from Bariloche Foundation - FB) or for knowledge production on these issues (such as the Center for Economic Research Instituto Torcuato Di Tella - ITDT); b) paradigms and conceptual innovations disseminated by international organizations like the UNESCO and the OAS, which emphasized the distinction between 'policy for science' and 'policy through science' and the need to incorporate science policy within the overall framework of public policies and economic and social planning.

The process of increasing overlap between state agencies, research institutes and international organizations that took place in Argentina since the 60s on (Camou, 2007), implied that some members of academic institutions and research centers, as ITDT and FB, participated in the meetings organized by the UNESCO and the OAS and intervened, at the same time, in various stages of the process of policies elaboration. Thus, at least during the first half of the 1970s, the S&T policies were no longer the exclusive field of the natural sciences, incorporating new actors as specialists in such policies, in development, or in economics.

The second feature of this paradigm is the systematic diagnostic studies, based on methodologies and frameworks disseminated by international agencies. Diagnoses studies are specific ways of conceptualizing research activities, their dynamics and functions, and they are also objectifications of certain intuitions regarding the (functional, organizational, etc.) shortcomings of S&T policies, as well as the actions required for the development of the sector. Consequently, it is interesting to compare very schematically the first two studies about the national research system. The first, conducted by the CONICET in 1966 at the request of UNESCO, put the emphasis on the

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given to technical personnel and planning or management control offices, and the establishment of ideological filters for recruitment into positions of responsibility. In parallel, this mode of organization tended to establish close institutional links between planning and budget, based on the assumption that the greater centralization of resources, the greater the chances of coordinating the activities of various state agencies coherently (Oszlak, 1980). Moreover, Mariano Castex, who was the ideologue of this institutional innovation, said that he based the institution on the Belgian model of Council, issued in Argentina by Jacques Spaey, general secretary of the Belgian Science Policy Council and UNESCO expert, who visited the country in those years. On the creation of CONACyT and SECONACyT, and the influence of UNESCO, see Feld (2010).

accounting for financial and human resources by agency and by discipline, presenting the data in a relatively uncritical way and highlighting the concerns of the 50s and 60s: the growth of the 'critical mass' (UNESCO, 1970).

In 1969, Alberto Aráoz (researcher from Di Tella Institute and participant in various OAS' seminars on science policy), conducted a new study at the request of the SECONACyT, based on conceptual specifications and recommendations proposed by UNESCO and OECD. Using the survey as a methodological tool and 'the institute' as the unit of analysis, the evaluation aimed to show the distribution of resources by sector, discipline, region, type of activity (basic research, applied research, development, related activities), 'applicability' fields (acquisition of knowledge, farming, industry, mining and nuclear energy, etc.) and origin of funding (budget, grants, research contracts, loans, grants) (SECONACyT, 1971a). Thus, the report was intended to assess not only the scientific potential, but also the balance or the degree of organizational efficiency of the S&T infrastructure, as well as the orientation of efforts based on economic and social needs. Unlike the 1966 study, Aráoz work had a highly critical tone of the dominant paradigm, which echoed the concerns expressed in the mentioned local forums, but giving them the 'objective form' of quantified data.

The third feature of this paradigm has to do with the expression of policies in plans and prescriptive documents based on previous diagnoses. Therefore, the criteria used in the 1969 diagnosis were collected by surveys conducted in 1982 and 1988 not only for comparison purposes, but they were also the starting point of the policy documents produced during the entire decade of 1970. Indeed, the plans drawn up in 1971, 1972 and 1975 aimed at solving some of the problems stated in 1969 diagnosis, which could be divided between those related to the relationship between science and society and those associated with organizational effectiveness of S&T system (SECONACyT, 1971b; SUBCyT 1972; SECyT, 1975).

Regarding the first question, the diagnostic study noted a marked predominance of expenditures in basic research (30%) and applied research (49%), over development activities (21%) compared to the distribution observed in other countries. According to the report, the cause was that the engineering sciences (where the share going to "development" was higher), represented only 10% of current expenditure on R&D, while the natural sciences, nearly three times more important, were rather oriented to basic research (SECONACyT, 1971a: 23-24). Furthermore, the distribution of research projects among potential application fields showed some prominence of 'knowledge

acquisition' (31.1%), followed in descending order by 'health and hygiene' (21.4 %), 'agricultural activities' (19.9%), 'physical, economic and social infrastructure' (13.6%), 'industry' (6%), 'advanced technology' for nuclear energy, space and defense (3.1%) and 'mining' and 'nuclear energy' (less than 1%) (SECONACyT, 1971a: 173). The conclusion reached thanks to these figures was that the effort of surveyed institutes was not strongly oriented towards economic development purposes, particularly regarding the industry.

To approach this problem, the action lines proposed by the Secretary, tended to select priorities and to establish some mechanisms of 'transfer'. While initially the funding lines for priority areas were defined in a rather vague way, plans gained greater specificity over the years; so, the 1975 plan established four national programs under the category of 'priority programming': food technology, electronics, endemic diseases, housing. These four programs, to which a fifth on non-conventional energy was added, continued to operate until the advent of democratic government in 1983, which contrasts with institutional discontinuity that characterized the entire decade of 1970. Meanwhile, the so-called 'transfer' was associated in the plans with three types of actions: two of them, with specific lines of funding, were 'extension activities' (agricultural, industrial, mining, marine, housing) and 'diffusion' (designed to make knowledge available to potential users or generate trade within the community). The third had to do with the transfer of knowledge to the private sector and, more precisely, with the development of industrial research. While the 1971 plan proposed implementing a law to promote tax relief on salaries and investments for firms working in research projects of 'national interest' (Law No. 18.527/69, given by the CONACyT), the 1972 and 1975 plans proposed a funding line called 'concerted actions' to cover the business risk in research, linking research institutions and users, funding up to 50% of the total cost of projects proposed jointly by S&T institutes and companies.

In regard to the question of the organization, the study made by Aráoz stated two shortcomings: First, it noted the atomization of the institutional set, due to the predominance - very marked in universities- of small institutes (low number of scientists and low amount of financial resources spent annually<sup>6</sup>), as well as the dispersion of scientists' efforts in several simultaneous projects and the high percentage of researchers (35%) working independently and without ties to any group. Second, the survey highlighted the inefficient regional distribution of scientific and

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<sup>6</sup> For example, 30% of the institutes had five or less researchers and only 15% had a reasonable size, with twenty or more researchers.



technological resources, showing the strong concentration in the metropolitan area and the Pampas: the metropolitan area contained a third of the research institutes and about half of the resources (staff and running costs) (Aráoz, 1974: 8-9).

Responding to the problem of fragmentation, besides the fact that some of the prescriptive documents proposed an intensive policy for training human resources through scholarship programs, all plans proposed mechanisms for the integration of related research projects within large programs. Regarding the regional imbalance, the creation of regional commissions for developing diagnoses and identifying priorities was a constant throughout all the period. Also, some plans as the 1971 and 1975 contained a special category of programs devoted to projects of regional interest.

While it is not clear that all the features of this paradigm will endure after the 1976 military coup, the documents show the existence of continuity in certain policy objectives. In fact, in 1980 the SECyT published a resolution setting ten goals of science policy, rooted in the action lines promoted by the Secretary since the early 1970s: “These ten specific objectives -stated a CONICET document- may be found in the rules issued by the National Government or SECyT in 1971, 1973, 1976 and in subsequent years until today” (CONICET, 1983: 9). The question that we pose here is on the role of the Secretary in the implementation of these objectives.

### **3. The implementation of the paradigm: the weakening of the Secretary and the reorientation of CONICET.**

#### **3.1. *The weakening of the Secretary: budgetary constraints, inter-institutional competence and legitimacy problems***

Having analyzed the main objectives and instruments designed by the SECyT, some questions arise about the capacity of the agency to steer S&T policies. One way to approach the problem is through the analysis of the S&T budget, which was incorporated as a special item (objective 8) of National Budget (NB) in 1972. As shown in Table 1, while between 1972 and 1975 there is a downward trend in the percentage of objective 8, between 1976 and 1982, the percentage increased steadily from 1.54% up to 2.90%. During the same years, the objective 8 also grew measured as a percentage of GDP: from 0.28% in 1976 it rose to 0.40% in 1982. Overall, these figures are not very different from those observed between 1961 and 1966, when the S&T expenditures varied between 0.31% and 0.4% of GDP.

**Table 1: Percentage of the NB and GDP for Objective 8.**

Year	O8/NB	O8/GDP
1972	1,95%	0,23%
1973	1,83%	0,27%
1974	1,62%	0,28%
1975	1,34%	0,28%
1976	1,54%	0,28%
1977	2,24%	0,31%
1978	2,33%	0,35%
1979	2,60%	0,33%
1980	2,81%	0,37%
1981	2,88%	0,39%
1982	2,90%	0,40%

Source: SUBCyT (1982)

In that scenario, the share of the SECyT was really marginal. Not only it had a very small percentage of the total budget, but since 1976 it actually decreased (Table 2). Even if we consider that the budget of the Secretary was intended exclusively for grants and excluded the support of human resources and institutions, the resource distribution does not express in any way the vocation of thematic, geographic and socio-economic orientation expressed in the S&T plans: only a 30.4% of the SECYT budget in 1977, a 16.27% in 1978, a 50% in 1979, a 40% in 1982 and a 33% in 1983 was allocated to the five aforementioned programs (SECyT, 1980; SUBCyT, 1982; SUBCyT, 1983b). The rest of the budget was distributed under the title of ‘R&D projects’ or ‘institutional support’ among various agencies (including the CONICET) to be used according to their own criteria and/or programs. Thus, the fact that most of the resources of the Secretary have not been spent to finance competitive projects in pre-established research lines, limited its already scarce ability to orient research. The question, then, is what elements determined this budgetary and institutional fragility.

**Table 2: SECyT share in Objective 8.**

Year	SECyT/ O 8
1972	2,40%
1973	8,80%
1974	5,80%
1975	8,90%
1976	5,00%
1977	9,20%
1978	5,70%
1979	4,70%
1980	3,10%
1981	2,70%
1982	2,30%

Source: SUBCyT (1982)

The first factor has to do with the lack of legitimacy of the Secretary, as a consequence of three elements: a) its difficulties to convene and negotiate with public research institutions over which it aimed to intervene; b) its double purpose of implementing policies based on a new paradigm and undermine the power of Bernardo Houssay, a figure with a large symbolic capital, which had the support of a wide part of the academic community, since he was a Nobel Laureate and the first President of CONICET<sup>7</sup>; c) the authoritarian context in which the Secretary was created, that involved the political intervention of universities (sometimes accompanied by violent episodes), the infiltration of the intelligence services in various agencies (including the CONICET) and, therefore, the opposition of a major part of the academic community. All these elements can be exemplified with some editorial articles published in *Ciencia Nueva* (CN) journal. In 1971, CN published a highly critical editorial about the first S&T plan, that emphasized: a) the unattainable character of the goals set in quantitative terms, b) the lack of specifications about priority research lines among which resources would be distributed; c) the prioritization of the scientific structure over development objectives; d) the exclusion of the scientific community in the design of the plan that. According to this article, “[the plan] was exclusively made by the Secretary of the CONACyT without consultation with research organizations, centers, commissions,

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<sup>7</sup> In 1988, Caste, noted that, with the creation of CONACyT and SECONACyT, "the idea of Onganía, quite reasonable, was to block Houssay's power". According to Castex, this strategy could not be accomplished by removing Houssay from office, because it would have been a highly unpopular measure.

universities and other entities directly affected”(CN, 1971, 10: 3-4). In 1972, another article stated: “If there are scientists at CONACyT, they are there as civil servants, and if their participation in the CONICET is reduced to the integration of advisory committees, above their advice the SIDE has the power to decide, so little or nothing can be said about the 'scientific community driving the process” (CN, 1972, 17: 4)<sup>8</sup>.

The second factor is the process of institutional competition that the creation of the new Secretary sparked, especially in relation to the CONICET, which arrogated to itself the role of science policy director. Before rumors about the creation of the new agency, in May 1968, three members of the Board of CONICET presented to their colleagues a project for the creation of a Science Policy Council, composed by CONICET (as the main agency) and representatives of the ministries, CNEA, the Council of Universities Presidents, CONADE and CONASE. The central argument was that “the proposed creation of the Secretary of Science, affected by political influence, could affect the stability of the Council”. Consequently, it was necessary to go ahead and “develop science policy within the country placing the Council as the coordinator of other agencies, since it does not have today all the science in its hands” (CONICET, 220, 10/5/68).

Once created the Secretary, the CONICET exerted a strong pressure to take part in the design of the plan and the evaluation of projects and programs to be financed by the Secretary. Its strategy was partially successful due to the weakness of planning mechanisms provided. Although the plans identified priorities (in a more or less diffused way) and advocated a policy based on (social, economic, strategic) demands, they assigned to the diverse S&T agencies the power to approve projects, group them into programs and establish the budgetary requirements, instead of defining specific programs and funding lines for competitive projects. In short, it was a ‘bottom up’ method that tended to reproduce the dynamics of the academic field and was more focused on organizing S&T budgeting than on steering research to specific goals. Thus, in the early years of the 1970s, public research agencies organized their own programs, which were assessed by an evaluation body of the Secretary, composed of representatives of the same agencies.

Additionally, after the creation of the Secretary, the CONICET developed an institutional expansion strategy, characterized by the creation of new institutes or the transfer under its tutelage of some existing ones through agreements with corresponding institutions. This policy was carried out both to strengthen the Council role against the threat posed by the Secretary and

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<sup>8</sup> SIDE is the Spanish acronym for “State Intelligence Agency”.

to shield universities' institutes from government intervention (which in some cases involved resignations, dismissals and dismantling of research groups), or from the ambiance of political unrest fueled by various sectors students and the teaching staff.

In 1973, with the restoration of the democratic regime, Perón government decided to refocus the mission of the Secretary, transferring it from the Ministry of Planning to the Ministry of Education. In parallel, the rising conflicts in CONICET after Houssay's death in 1971 (which reflected the tensions that went through Argentine society during those years) determined the intervention of the Council, the dissolution of the Board and its transfer (also) to the Ministry of Education. Likely, the purpose of this initiative was the unification of the policies for two institutions historically linked (CONICET and universities) under the steering of the Secretary, but this also meant a reduction of the intervention power over other S&T institutions and a diminution of the capacity to negotiate the budget.

However, the sudden death of Perón and the increasing weight of the Peronist right wing marked an abrupt change of the course. The new minister of education considered that the resources for the Secretary "[lost] in the night of time" and that "pure scientific research [should] take place outside the universities, in private companies or in other public/private institutes"". He not only began a process of ideological cleansing in universities, but also led to the resignation of the secretary of S&T and the consequent weakening of the agency (Ivanissevich, 1974: 14). Thereafter, and during the military regime that ruled the country between 1976 and 1983, the creation of institutes in CONICET was widely supported, while universities were identified as centers of political turmoil and lost share in budget. As Bekerman (2009 and 2011a) noted, since 1976 there has been a transfer of resources from universities to the CONICET. While between 1961 and 1966 the distribution of funds by agency (taking into account the most relevant ones) remained relatively constant, with a strong predominance of INTA, universities and CNEA, since 1972, and more deeply since 1976, the following trends are observed: a) a progressive decline in the share of INTA and universities, much steeper in the case of the latter since 1976 onwards; b) a progressive and marked increase in the share of CONICET and CNEA since 1976.

**Table 3: Evolution of the distribution of S&T budget by agency (1972-1983)**

	1972	1974	1976	1978	1980	1981	1982	1983
CNEA	5,1	5,1	11,7	10,4	22,4	23,2	31	37,8
INTA	38,4	40,3	34,5	31,1	24,9	24,9	21	17,0
INTI	5,3	0,5	0,3	0,3	0,2	0,1	0,2	0,2
CONICET	15	18,1	29,5	24,7	30,7	31,5	27,2	27,3
Min. of Defense	10,2	10,1	14,2	22,2	11,3	10,3	10,7	8,0
Nat. Universities	23,8	22,8	7,8	9,1	8,9	8,3	6,5	6,1

Source: Gertel (1987).

Note: Some INTI expenses for S&T were included in the budgetary item 'Economic Development'.

Since 1976, with the CONICET already intervened and placed under the Ministry of Education, SECyT aimed to make a clear distinction between its own field of action and that of CONICET: while the first would be responsible for policy making and management control, CONICET would focus on the implementation of such policies. One of the first documents published by SECyT after the military coup of 1976 stated: "Certainly science policy cannot be dictated by the simple supply of projects or by the requirements for the free and spontaneous training of new human resources. Instead, the scientific authorities must set priority frameworks, define areas and issues to encourage. This can and should only be done by a very close functional linkage between the Secretary of Science and Technology and the CONICET" (SECyT, 1977: 6). A report made by CONICET in the early 1980s points out that much of its objectives were set by the SECyT, mainly: geographic decentralization, selection of potentially applicable research lines, and creation and strengthening of research groups.

### **3.2. *CONICET: a new institutional model. Expansion and redirection of resources.***

Conversely to the case of SECyT, CONICET budget grew steadily and increased sevenfold between 1970 and 1981. As part of this development, the expenses that grew the most were those for building infrastructure and scientific equipment, followed by scientific and technical staff. This expenditure structure responded to the policy of establishing institutes belonging to the Council (or with mixed dependency) started in 1969. To give an idea of the magnitude of this process it is important to note that, while in 1966 CONICET had just three institutes, by 1971 the number had increased to 13 and, between 1976 and 1981, it went from 55 up to 100 (CONICET, 1983).

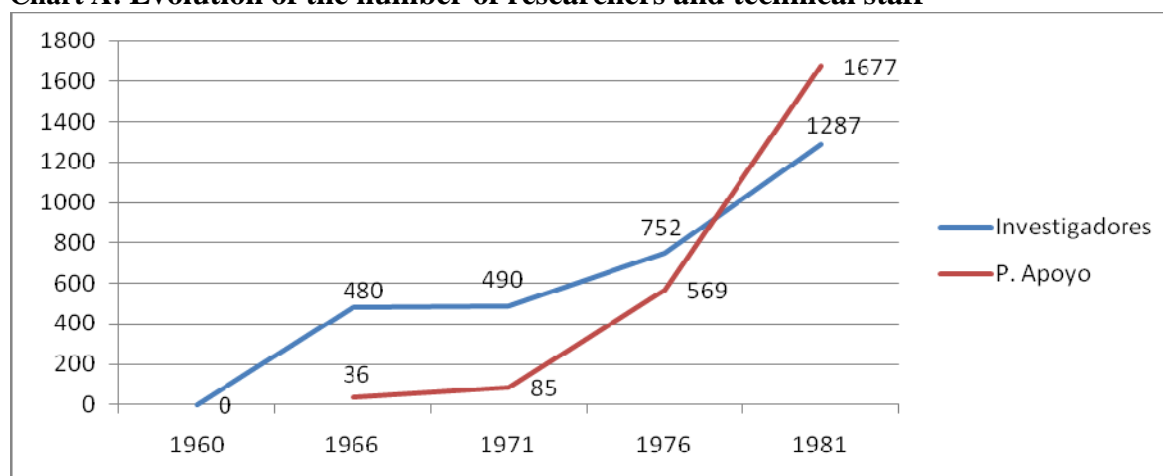
Simultaneously with the increase in the number of institutes, since 1972, the budget for grants incorporated the category of ‘development programs’”, whose increase was also remarkable: in 1984 CONICET housed 75 programs (CONICET, 1989). Thus, the development programs increased their share in grant funds to the detriment of the funds granted to individual researchers or small groups classified by disciplines, that the predominant category between 1958 and 1966: between 1972 and 1978, less than 10% of the funds went to projects classified by disciplines, while the rest was for development programs, without specifying the field or discipline. This observation is important because both, institutes and development programs, were funded by block grants which did not require an ex-ante evaluation. As Caldelari et al. (1992: 174) have stated this funding modality inaugurated “a new model of institutionalization of scientific equipment and work organization”: grants were no longer exclusively individual and competitive and begun to be awarded as general budget (block grants) for the support of institutes<sup>9</sup>. Also, according to a document published at the beginning of the 80’s, the system of institutes installed some discretion in the distribution of funds: “the majority of the directors exercised almost total power over the rest of the research teams, fellows and technical staff: as they distributed funds for staff, equipment and infrastructure at their own discretion, the cases where personal sympathies or antipathies meant privilege or marginalization became numerous” (CONICET, 1989: 3).

A second important change had to do with the strengthening of research groups, aimed at solving the problem of the ‘atomization’ raised in the evaluation reports. The increasing amount of institutes was accompanied by an increase in the number of researchers and technicians (Chart A). Between 1966 and 1981 there was an increase of 168.12% in the researcher staff, being the period 1977-1981 the one with the highest annual average admissions. Comparatively, the growth of the technical staff was much higher, because it was not until 1965 that the technician scale was established and its growth was marginal until 1971: it rose from 36 members in 1966 up to 85 in 1971. From that year (and more strongly from 1977) to 1981, the technical staff grew a 1972.9%, reaching 1677 members, which exceeded the number of researchers (Figure A). Finally, there was also an increase in fellowships, but the internal ones grew more than the external ones: while between 1958-1966 internal fellowships accounted for 61.7% of total fellowships, between 1977 and 1981 they came to represent the 88.6%.

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<sup>9</sup> The grants classified as ‘research programs’ were also devoted to the support of institutes (Gottifredi, 2013).

**Chart A: Evolution of the number of researchers and technical staff**



Source: Own elaboration based on CONICET Reports (1961-1966) and CONICET (1983)

The increase in personnel was recorded in a self-evaluation conducted by the CONICET in 1981, which reflected the concern for the ‘atomization’ problem, emphasizing the improvement of the rate researchers /technical staff and researchers/fellows, in the magnitudes set forth in table 4. According to the report, the policy of strengthening research groups had led to significant changes in the institutional setting: 57% of the institutes housed between 11 and 40 people, 19% between 41 and 70, 6% over 70 and a 17.5% had 10 or fewer people (CONICET, 1983).

**Table 4: Rate technical staff/ researchers y fellows/ researchers.**

	1972-1976	1977-1981
Technical staff	0,612	1,158
Fellows	0,406	0,762

Source: CONICET (1983).

In relation to these changes in the institutional model, it has been stated that the creation of CONICET institutes, meant the ‘emptying’ of universities and a breakdown in the relationship between research and teaching. However, this statement may be nuanced taking into consideration some facts. First, a national assessment conducted in 1982, in which the data are compared with the one conducted in 1969, shows that the 1749 full-time researcher of public research organizations (not including universities) in 1969 (37.1 % of the total) increased by 155.6% in 1982, reaching a total of 4470 (43.7% of the total). Meanwhile, researchers belonging to the higher



education sector had a significantly lower percentage of increase (39.1%), passing from 53.4% in 1969 (2515 in total) up to 34.2% in 1982 (3497 in total) (SUBCyT, 1983a). Even if researchers from institutes exclusively belonging to universities declined in relative terms, it has to be noted the increase produced in multiple dependency institutes (many of them linked to CONICET and universities simultaneously), which was a 1475%: in this case, the 110 researchers existing in 1969 (2.3% of total) rose to 1733 in 1982 (16.9% of total). Moreover, a report by the CONICET (1983) points out that a high percentage of the scientific staff of CONICET settled in University institutes, were them or not under dependency of the Council: in 1980, 62.7% of researchers and 48.7% of the technical staff was based in national universities (CONICET, 1983)<sup>10</sup>.

Additionally, it should be noted that 17% of CONICET research grants went to universities, while 70% of SECyT funds also went to universities (Bekerman, 2011b; SUBCyT, 1983b). Finally, note that while the status of the Research Career established the compatibility with teaching positions (one position and in some cases two), the evolution of researchers' salaries seems to have encouraged teaching activities. According to a former member of the Board, since 1973, the researchers' salaries were not only reduced, but they were also eroded by inflation: "This situation, says Lazzarini, led to loosen the requirement for a single chair, what in many cases distorted exclusive dedication to research" (Lazzarini, 2012).

A final transformation of the institutional model has to do with the problem of regional imbalance and the orientation of research lines. In 1979 the CONICET launched a policy of regional centers by obtaining an IDB loan of U\$ 42 million (to be added to U\$ 85,000 contributed by the National Treasury). Within this framework several centers were created in Mendoza (CRICYT), Santa Fe (CERIDE), Bahia Blanca (CRIBABB) and Puerto Madryn (CENPAT)<sup>11</sup>, which aimed to incorporate researchers in the respective regions, to link them with local universities, to develop interdisciplinary projects, to install services required by the various institutes grouped in each center and to contribute to regional economic and social development (CONICET, 1980). This policy explains, at least partially, the geographic redistribution of institutions and human resources. Thus, the percentage of CONICET institutes, programs and services located in the countryside rose from 21% in 1975 to 30% in 1981. Moreover, since 1976

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<sup>10</sup> By 1982, only 35 institutes depended exclusively on CONICET, while the rest had a multiple dependency (SECyT, 1983a).

<sup>11</sup> Apart from these centers, other ones were created in Ushuaia (CADIC), Rosario (CERIDER) and Nordeste (CERNEA). About the IDB loan, see Bekerman y Algañaraz (2010).

on, the percentage of staff based in the metropolitan area (researchers, technicians and trainees) decreased between 10% and 15% in relation to the period 1961-1966 (CONICET, 1983).

Furthermore, the creation of regional centers was linked to a policy that selected research lines. By 1980, 24 research lines were defined, consisting of 93 projects to be developed in the 10 institutes located in regional centers. According to the report of the 'Development of Regional Centers Program', the research lines proposed by the various institutes were selected following sector and regional priorities, identified in several diagnostic and prescriptive documents, produced since 1969. This meant, as some accounts have pointed out, that weaker institutions in terms of academic excellence have been funded, but they were more relevant in terms of socio-economic relevance (Leloir in *Quid*, 1983; Gottifredi, 2013).

#### **4. Concluding remarks**

As shown throughout this article, from 1966 on there was a shift in the science policy paradigm, whose first evidence was the attempt to relegate to the background the institutional model closer to a 'parliament of scientists' (CONICET) than a 'government bureaucracy' (concepts are borrowed from Rip, 1996). One feature of this process was the loss of specificity of science policy, which came increasingly similar to the mechanisms used in other public policies, in two ways: first, because its formulation required a set of operations common to any policy (conceptual specifications, diagnostic studies, selection of courses of action and implementation mechanisms, etc.), for which experts skills were required, not (only) from the 'hard sciences', but also from social sciences<sup>12</sup>. Second, because the perception of S&T policy as a mode of intervention that exceeded the traditional small group of recipients (the scientific community) and generated social impact on other areas, actually opened the door of the controversy to new actors who claimed their right to participate in the formulation of policies, emphasizing the 'public' nature of these policies. Indeed, besides the influence of international agencies and the military government's technocratic orientation, this paradigm shift was linked to the emergence of a more or less widespread concern among researchers and intellectuals. The arguments and critical reflections expressed, among other issues, a process of demystification of the image of science, on two levels: on a theoretical level, it meant the questioning (although not necessarily the disappearance) of what is now called 'linear

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<sup>12</sup> A similar process has been analyzed by Brickman and Rip (1979) for the cases of France, the Netherlands and the U.S. during the 60's.

innovation model'; in an empirical level, it involved the verification that reaching a stage of scientific excellence, relatively achieved in the country, was not necessarily effective in terms of utility and, therefore, it was necessary to complement the 'policies for science' with the 'policies through science'.

The creation of the Secretary, based on the consideration that the CONICET had failed in properly playing the role of the driving institution of science policy, had the mission to introduce some coherence and effectiveness in a 'balkanized institutional system'. Nonetheless, the Secretary partially failed in the implementation phase due to, among other reasons, its difficulty in understanding the typical heterogeneity of scientific-technological area, composed by of a set of institutions with different objectives and degrees of autonomy (financial and operational), support and prestige, as well as budgetary and hierarchical structures. In that scenario, the resistance to the imposition of a common regulatory framework by a higher institution (and, of course, the resources transfer to the latter), can lead to two situations: a) strong conflicts between agencies; b) a plan with general and vague goals enough to avoid conflict, but with a very limited operation. Therefore, the success of the institution was strongly dependent on critical factors such as the authority, prestige, legitimacy, the ability to negotiate with various state units and the supports (from government or other 'clients') (Oszlak, 1976). The difficulties of the Secretary to obtain this 'capital' were the main cause of its weakness: first, the origin of this agency was associated with a government that attacked the development of research in the universities and, second, it competed with the most representative institution of the academic field (the CONICET), which (despite its flaws) had spent years building a strong recognition based on the academic-political authority of its principal founder and on its effective performance in the creation of a body of professional researchers through a set of instruments that benefit various institutions.

Moreover, the attempt to increase the degree of integration of S&T system, or their interdependence with the production system, assumed that individuals and institutions behave in a rational and disinterested way, subordinated to the general interest. By contrast, the correlation of forces between various actors, conflicts of interests, pressures and negotiations that went through the process of creating a new body, have questioned both the alleged coherence and unity of action of the state (even in times of authoritarian governments) and the viability of the process of imitation, transplantation or dissemination of institutional (considered as) 'successful' models. For example, the attempt to implement the 1971 S&T plan highlighted how various actors negotiated

the continuity of their own research agendas and their own instruments, adapting themselves to the priorities and mechanisms established by the Secretary. This shows that even when ministerial hierarchy agencies set priorities or agendas more consistent with the social or economic requirements, it remains to specify the type of instruments (incentive mechanisms, evaluation and control, among others) that allow its implementation, avoiding the capacity of 'conversion' or negotiation of the researchers, who do not always converge with the supposed general interest. That same 'conversion capacity' was expressed at the institutional level and determined the CONICET expansion and differentiation strategy when its territory was threatened. Indeed, the decision of the government to create a new policy and planning agency boosted its conversion strategy towards a performance-based model, expressed in a progressive institutional expansion that strengthen the agency, beaten not only by the government but also by the climate of politicization of the academic field. The military government installed in 1976, who considered universities (particularly the more traditional and populated) as subversive and dangerous institutions, supported the Council's strategy, incorporating some of the goals set by the paradigm emerging in late 1960's. This means that, despite the severe political instability and the progressive weakening of the Secretary, the diagnosis of the S&T national system and the public intervention modes remained at least until the early 1980s.

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