# How do Academics adopt new practices during a reform? The Evolution of doctoral education in France 1992-2009.

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# The Evolution of doctoral education in France 1992-2009.

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*Abstract*

*How have reforms in French doctoral education and academic research been implemented? How do changing doctoral education practices lead to changing research practices? New practice adoption among academics usually happens incrementally in the course of their everyday activity. Top-down organizational change requires these autonomous professionals to adopt new practices willingly, so as to comply with the reform. Understanding the micro-level conditions under which this adoption happens is critical to the management of change in universities and research organizations. Drawing on the empirical analysis of a reform seeking to improve PhD supervision in French universities, we find that academics adopt new practices only once they have performed a cognitive reframing of the situation, and under the condition that new practices are – or can be made – compatible with their autonomy of judgment and their extant professional role and identity. Otherwise, the reform leads to ceremonial adoption, hesitation or rejection of new practice. Paradoxically, coercive features of the reform may support new practice adoption, but only when they are taken over by professionals themselves and support them in the building of a leader figure compatible with professional values.*

Key words: University policy, Science policy, Change implementation, Practice adoption, PhD, Research Practices.

# 1. INTRODUCTION

How does a reform get implemented in public sector research organizations and universities? Universities have not only witnessed dramatic growth over the last 20 years but, in most countries, their research activities have also undergone radical reorganization led by top-down reforms, some of which are implemented and produce the expected effects, while some are rejected and others adapted. The mechanisms by which a reform will produce effects in higher education and public sector research organizations is thus a critical issue for research policies.

Whether labeled as "planned" (Neves and Caetano 2009), "deliberate" or "strategic" (e.g. Hinings and Greenwood 1988, Denis et al. 2001), top-down organizational change can be considered implemented when practices have changed: first, this means the reform is no longer just "ceremonial" but is actually having an impact on the organization's production process; second, practice adoption is also a means to trigger a shift in logic which will institutionalize change, so that it feels 'natural', thus finalizing the process of structuration.

However, practices prove difficult to change from top-down, because they develop locally. This is even more true in a professional organization such as in research and higher education, where academics are autonomous professionals whose practice are inspired by professional, not organizational considerations.

Therefore, our research question becomes how do academics, as autonomous professionals, adopt new desired practices in a context of a reform? To explore this question, our paper studies the reform of French doctoral education during its implementation. French doctoral education has been suffering from over specialization and lack of professionalism. In 1992, the French government launched a reform to improve doctoral education, seeking to make PhDs skills more standard across disciplines and more adapted to the non academic job

market. It also sought to trigger the emergence of communities of researchers around transdisciplinary research programs rather than disciplines, trying to change how science was to be performed. How did such top-down change translate into a change of practices?

Practice adoption is rarely studied as the primary target and outcome of a top down change. When studying practice dynamics, scholars study how they are created as a result of spontaneous innovation in activities (Lounsbury and Crumley 2007) or via institutional entrepreneurship (Maguire, Hardy and Lawrence 2004), and how they diffuse horizontally at the macro level of populations or social settings (Strang and Meyer 1993, Rogers 1995), institutional fields (Greve and Davis 1997, Lounsbury 2007) or across national boundaries, (Tuschke and Sanders 2007), thus leading to isomorphism. At the meso level of the organization, members' reactions in terms of practice following the introduction of externally produced technological (Orlikowski 1993, Barley 1986, Cooney and Sewell 2008; Garud, 2002) or scientific innovations (Ferlie, Fitzgerald et al. 2005) have also been studied. On the other hand, different dimensions of reforms have been studied: implementation literature attempts to list the conditions under which a reform has more chances to be implemented (Winter 2006), while from a less normative viewpoint, public administration and organizational theory scholars describe the diverse obstacles faced by reformers, such as absence of impact (Brunsson and Olsen 1993), goal distortion (Selznick 1949), ceremonial compliance and decoupling or buffering (Oliver 1991), or unintended consequences (Merton 1936, Blau 1973). We believe that top-down organizational change outcomes might be better understood if change is studied as a process of practice adoption. The practice approach to organizational studies allows for the connecting of micro-processes of change with such field-level phenomena as institutional logics (Lounsbury and Crumley 2007).

We find two types of mechanisms in new practice adoption. ***Vertical mechanisms*** are the coercive means at the reformers' disposal, such as threats on resources but also delegitimization of extant practices. ***Transversal mechanisms*** such as reframing a problem and proximity of situation rely on the dynamic between professional segments. Academics adopt new practices only once they have performed a reframing of the situation, and under the condition that new practices are – or can be made – compatible with their autonomy of judgment and their extant professional role and identity. Otherwise, the reform leads to ceremonial adoption, hesitation or rejection of new practice. Paradoxically, the coercive means at the reformers' disposal are not effective through direct power, but to the extent that they give power and legitimacy to some academics motivated, for diverse reasons, to take the responsibility for implementing the reform. Thus, we show that the way for a reform to be effective is to help academics to act as leaders, because the implementation of new practices relies essentially on them. These results also suggest that the ambitions of the reformers might be limited by the mission and identity of academics.

## 2. LITERATURE REVIEW

### 2.1 – *FROM REFORMS TO PRACTICES*

#### 2.1 .1– Practices adoption as a critical step in organizational change

We define practice as a social actors' way of performing a set of activities identified as a professional routine, a task, a ritual… Compared to an activity, a practice is institutionalized as a way of doing things that is shared among actors and associated with socially constructed and shared meaning, thus making sense beyond the mere action. This institutional dimension is well translated by Jarzabkowski, : *"Jarzabkowski (2005) views 'activity' as the actions of and interactions between actors as they perform their daily duties and roles, while 'practice'*

*refers to activity patterns across actors that are infused with broader meaning and provide tools for ordering social life and activity"* (Lounsbury and Crumley 2007: 995)

Practice is a useful concept to highlight some obscure parts of organizational life, because it captures a kind of knowledge that people constantly apply in the performance of their tasks, but which cannot be easily codified, transferred to other settings or controlled, as it is developed through time, experience and socialization in a specific milieu (Bourdieu 1980, Schatzki et al. 2001, Weick 2003). Moreover, how practice gets shaped and become institutionalized attracts the attention of social scientists because it is a locus of connection between action and institution, agents and structure: the repeated activities of actors in a social setting somehow turn into something more solid that begins to make sense and constrain action (Giddens 1984); observing practice allows us to understand how actions make up institutions, and how institutions constrain actions. Practice evolution is a turning point of social change process and is an important key to assessing whether and to what extent change has occurred following a top-down organizational change attempt.

Fernandez and Rainey's (2006) literature review on organizational reforms in the public sector lists eight factors that might impact the result of change initiatives, of which the two last - "institutionalize change" and "pursue comprehensive change" - insist on the necessity for a reform to translate into changes in practices if it is to have an impact: *"To make change enduring, members of the organization must incorporate the new policies or innovations into their daily routines."* Recognizing that embedding change is not easy, they mention Armenakis, Harris and Field's (1999) model for reinforcing and institutionalizing change, which equates "fundamental organizational change" with a change of paradigm: *"Individuals are essentially asked to change their theories of what is good, what is the best way to do things, what is most valued, and what events mean and how they should be*

*responded to"* (Armenakis, Harris, & Field, 1999, p. 632).

These two models are prescriptive: they recommend reformers to pay attention to practices, but do not say how to do this and what fosters or hinders practice adoption by target populations. Authors actually examining the process of organizational change, such as Brunsson and Olsen (1993) or Bozeman (1999) integrate practices in their reflection at some point, noticing how difficult they are to change as planned. These authors conclude - each in their own way and with their own perspective - that top down organizational change initiative stands a good chance to *"slide over"* the practices it is actually trying to change.

## 2.2 – PRACTICE ADOPTION DEPENDS ON PROFESSIONALS

Practice adoption is often studied as a side phenomenon in practice diffusion literature (Strang and Meyer 1993, Rogers 1995, Wejnert 2002). The latter is immense, because both terms have a very general definition. Strang and Meyer note that *"Virtually everything seems to diffuse: rumors, prescription practices, boiled drinking water, totems, hybrid corn, job classification systems, organizational structures, church attendance, national sovereignty"* (1993: 487), so that kinds of practice studied can be social, organizational or institutional. In the organizational context, the term can refer to corporate behaviors (Davis and Greve, 1997), formal structures (Greenwood and Sudabby 2006, Thornton, 2002), and technological choices (Leblebici 1991). This is because the term 'practice' is used widely - as for instance, by Strang and Meyer: *"We use the terms 'practice' and 'innovation' interchangeably to refer to the diffusion item, which may take a variety of forms (a structural element, a policy, an attitude, and so on)"* (1993: 507).

In this paper, we focus on practice adoption in an organizational context. Diffusion implies that social actors take passive posture as practices travel as active entities throughout

the social fabric. The notion of adoption insists more on actors' agency instead, focusing on the trajectory leading to change in practices. Accordingly, Tuschke and Sanders (2007) make a useful distinction between adoption by 'courageous' adopters, when the legitimacy of practices is still contested, and diffusion, which they see as another kind of process altogether.

Two literature streams help in framing the issue of practice adoption in a context of top-down change initiatives: one on the adoption of innovations when they come from outside the organization, the other on professionalized organizations and the potential tension between the concepts of professions and organizations.

## 2.2 1– Literature on innovations adoption shows necessary local adaptation

Van de Ven and Hargrave note that, in comparison with neo-institutionalists, "*innovation scholars have focused more directly on the activities and difficulties that adopters experience as they attempt to implement technical or institutional innovations that were developed externally and mandated on host organizations*" (2004: 271). By and large, scholars tackling this topic unpack the work of adaptation that seems indispensable to the adoption of an innovation in a particular setting. Rogers (1995) uses the term "reinvention" to express how adopters modify an innovation to fit their local implementation setting and tailor it to their organizations' specific needs and constraints (Van de Ven and Hargrave 2004: 271). Marcus and Weber (2001) show that, in the absence of such a step, the adoption can be purely formal and not change anything in organizational procedures. "*The 'not invented here' syndrome is well known in all sorts of organizations*" (Van de Ven and Hargrave 2004: 271).

**2.2.2 – Top down change in professionalized organizations: an oxymoron?**

The mediating role of organization members in practice adoption is congruent with the literature about professionalized organizations. Strauss (1963) describes professional organizations as "negotiated orders": in such settings, how work is done does not primarily follow bureaucratic rules but is negotiated in a local context. Consequently, scholars who have studied professional organizations underline their tendency to segmentation: *"In general, professional organizations consist of a number of professional groupings, each working in their own directions, implementing their own professional values. How, then, is any measure of integration achieved in a professional organization?"* (Bucher and Stelling 1969: 10). This fits the situation of universities, consisting of professional segments defined by disciplines. Professional segments within universities and research organizations have also been defined as epistemic cultures (Knorr-Cetina 1999) generated by distinctive epistemic paradigms. The question of top-down change must take this specificity into account, as Denis et al. do in their study of organizational change in Canadian hospitals: *"This study provides some indication of how change may proceed in contexts where no-one has full control, where divergent objectives are pursued by different groups, and where the legitimacy of change agents and change initiatives cannot be taken for granted."* (Denis, Lamothe and Langley 2001:834).

Ferlie et al. (2005) go further into the black box of innovation adoption by professionals in their study of what predicts which innovations will be adopted in complex organizations such as hospitals and primary care practices. One would expect that in a medical professional environment, innovations whose scientific relevance has been proven (evidence based medicine) would be readily adopted: but their field research shows that the fact of strong scientific evidence backing for an innovation does not necessarily predict its

adoption by professionals. The reason for that counter intuitive result is that innovations generally entail changes in practices, which do not always result from efficiency-driven choices, but are strongly determined by institutionally defined rules. For example, the introduction of a new monitoring device for arterial conditions leads to a shift of responsibility for routine monitoring from doctors to nurses (Ferlie et al. 2005:124): the adoption of such an innovation then depends on whether the professionals concerned will be willing to or able to manage that shift of responsibility, which pertains to questions of role and identity more than to the strength of its scientific backing evidence. Interestingly, Ferlie's article illustrates that, even when an innovation seems like a mere technical adaptation or the adoption of a new technique or a new device, its adoption is strongly mediated by professionals to ensure it remains congruent with the features of their institutional environment.

Previous work thus shows that the effective implementation of top-down change in professional – such as research and higher education– organizations relies on the extent to which the professionals concerned will adopt new practices, that adoption depends on professionals and thus might vary from one professional grouping to another. We explore the conditions under which professionals adopt or reject new practices imposed during top-down reforms. We use a qualitative and ethnographic approach in a context of a reform still in the process of being implemented.

# 3. CASE STUDY: THE REFORM OF DOCTORAL SCHOOLS IN FRANCE

## 3.1 – CONTEXT

Each year in France, the Ministry of Research offers about 4000 PhD scholarships (Ministère de la Recherche 2004) consisting of three-year salaries for PhD candidates[1] working as junior researchers in research centers. Until the creation of doctoral schools ("DS"), the Ministry would attribute PhD scholarships to the M2 programs[2] directors, who would then select M2 student(s) receiving the scholarship(s) to prepare their PhD in one of the research centers affiliated to the M2 program. The teachers and director of the latter were also researchers in the former. Consequently, M2 programs were pools of future PhD candidates for the research centers, with the M2 program director being the main decision maker for scholarships attribution. The reform modifies how PhD scholarships are attributed. It creates doctoral schools as a set of research centers from one or several disciplines but working on a shared scientific program. Doctoral Schools become the primary recipient of and decision maker about PhD scholarships, thus replacing in this role M2 program directors.

### 3.1.1 – The objectives of the reform

This modification of the funding channel has the objective to have scientific communities emerging whilst building a strategic resource distribution system. The reformers thus seek to

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[1] This number has been steady since 1991. One third goes to Humanities and Social Sciences; two third go to Experimental Sciences. Additional PhD funding is provided by research associations, local government and private companies. In Humanities and Social Sciences, 75% of PhD candidates remain without funding (Ministère de la Recherche, 2004).

[2] M2 is the acronym for "Master 2", the fifth year of academic studies following three years of "License" and the first year of Master. It initiates students into research and comprises the writing of a paper based on an original research led by the student under a researcher's supervision.

make the distribution of PhD scholarships more simple and efficient, going from what is viewed as a "sprinkling" of resources (4000 PhD scholarships to over more than 3500 M2 programs), to a more consistent and rationalized funding of scientific projects selected by relevant communities (each of the 300 or so Doctoral School can now receive 10 or 20 scholarships and can concentrate resources on priority research projects).

The other objective is to improve doctoral supervision, which reformers claim necessary to make PhD attractive in the non-academic job market and thus address the issue of PhD unemployment. Reformers argue that academia in France only offers about 3,000 positions a year, and so cannot absorb all the 10,000 PhDs who graduate annually (ANRT 2005: 7). On the other hand, non-academic job market does not recognized the PhD as a specific diploma, and PhD's find it difficult to find positions that match their level of studies (Mangematin, 2000). Reformers say there are two reasons for this situation: the quality of the training received during the PhD is not satisfactory (as shown by the high attrition rate, the excessive length of time taken to complete the PhD, the sometimes disputable relevance of the topics, supervision which is sometimes only symbolic or inexistent and PhD students being used as cheap human resources by research centers but not benefiting from any real training in exchange); and the skills acquired by PhD graduates are not identified or valued in the non academic job market. Within the frame of doctoral schools, academics ought to formalize the content of PhD training and bind supervisors to follow common rules and respect common standards, agreed on collectively. Before the reform, the only requirement to start a PhD was to have successfully completed five years of university studies and found an academic willing to supervise research - what little farming existed was only bilateral.

### 3.1.2 – Governance and Organization

Doctoral schools are governed by Scientific and Pedagogic Councils (SPCs), composed half of academics from the research centers, and half of representatives of non-academic funders and future potential employers of PhD's (local government, research associations, companies, etc.) under an academic chairman.

The SPC targets PhD scholarships to priority research projects, selected based on research centers' suggestions and the doctoral school's research program; it must check on the quality of every student registering for a PhD, whether there is a funding or not, and whether this funding comes from the Ministry or not. Upon the School director's agreement, students start their PhD. A thesis contract is signed by the student and the supervisor (and three other parties: the lab director, the university president, and the private enterprise party, if applicable) which defines each of their rights and duties and refers to PhD as a paid, three-year teamwork experience in a research center. Beyond the third year of PhD, the continuation is conditional on the school director's authorization. Moreover, Doctoral Schools offer additional in-class training programs (network building, management and language skills, job search techniques…) and activities to help students' plan their future non-academic careers. The Ministry also uses Doctoral Schools to collect data on PhD training: length of completion, number of students per supervisor, professional trajectories.

### 3.1.3 – Promoted practices

By making research funding and PhD candidates' selection and supervision the main purpose of doctoral schools, the reform challenges several academics' practices. Gathering research centers from several disciplines in one Doctoral School suggests that academics can manage critical resources and make arbitrage across disciplines, while legitimacy is traditionally recognized within the borders of a discipline (Becher 1989, Blau 1973, Clark 1983). The

reform introduces collective control over individual practices of supervision, whereas this has been a subject entirely left to the discretion of supervisors, and academics, as peers, were not supposed to judge each other's supervision methods; the objective of professionalization suggests PhD should be considered as a training to diverse careers, while traditionally it has been leading exclusively to research and academic career. Finally, the thesis contract and the system of data reporting promote one pattern of scientific work and PhD studies, where the established patterns have been many and diverse: scientific work is collective and PhD is a three-year, funded apprenticeship with daily lab attendance.

The research design aimed at documenting the reactions of academics to this top-down imposition of new practices.

## 3.2 – RESEARCH SETTING

We chose two French cities which have between them 5 universities and 19 Doctoral Schools: City A ("campus A") has one university comprising 5 Doctoral Schools and city B ("campus B") four universities comprising 14 Doctoral Schools. Both campuses cover all disciplines and are embedded in dense industrial networks and economically dynamic regions. Table 1 presents an overview of the research setting, and Table 2 the main characteristics of the doctoral schools.

### 3.2.1 – Data collection

 Our field work was designed to follow academics in a context of reform, through interviews, documents and non participant observation of key moments in the life of doctoral schools:

We performed 90 semi-structured interviews lasting from 1½ to 2 hours (Table 3). Campus A's Doctoral Schools were reviewed in 2005, campus B's in 2007. 54 interviewees were from experimental sciences and 36 from Humanities and Social Sciences. We did not review each

doctoral school, but covered a variety of disciplines at both campuses, notably Engineering, Experimental Sciences, Social Sciences and Humanities, representing collective and individual organization of scientific work.

We made non-participatory observations of pedagogic and scientific councils (two meetings of Chemistry-Biology and one meeting of Law-Social Sciences, all on Campus A) and of 3 university meetings concerning non-academic career perspectives for PhD graduates.

Minutes of the very early meetings of some of the doctoral schools (when they were first set up, where one can see participants wondering about the right norms and how to function together) and legislative texts and reports were other data sources.

**3.2.2 – Data Analysis**

We analyzed the data so as to answer the following questions: How the reform is implemented through doctoral schools, what are the latter's' means of action? How do academics receive this reform? During interviews, we asked questions about the ways of funding research and selecting and supervising PhD candidates, in order to get a description of extant practices. When interviewees did not make any additional comment about a practice, we considered this as a mark of naturalized, old practice. When on the opposite practices would be commented, explained or criticized, we considered this as a mark of a recently adopted practice.

# 4. RESULTS

We selected 8 cases of practice trajectories which we found led to four different outcomes: adoption, ceremonial adoption, hesitation and rejection (Table 4). We analyze the trajectories leading to each outcome and the mechanisms involved. We start with three occurrences of adoption, and subsequently examine contrasting situations (other than adoption) to highlight what mechanisms were missing in non-adoption.

## *4.1 – ADOPTION*

During our field work, we were able to observe three new practices being adopted – in each case, academics actually changed how they performed their activities, even if only to a limited scope.

***Case #1: Biologists adopted a new way of allocating PhD scholarships, by choosing the project before selecting a student***

*Change* –Previously, the scholarship would be given to the best M2 program student, who would then choose the topic for their PhD – so that the research centre and the topic that would benefit from this funding depended on the student's choice.

*Difficulties* – In the previous system, supervisors knew the student before he or she was going to get the scholarship; such recruiting practice was seen as a way of avoiding errors of recruitment, whereas *"recruiting someone you've only seen for 10 minutes [during an oral presentation]"* (1 – Biologist) was considered risky. This practice also allowed supervisors to 'invest' in a student the year before the PhD, coaching them to be the best in class and thus to get the scholarship: they would – hopefully but not necessarily – then choose to work with the coach for their PhD. The 'return' on the investment (of this time and effort spent coaching)

was a student funded for three years who represented and additional human resource for the research team.

*Mechanisms* – Interviewees mention the explicit pressure made by the Ministry through frequent phone contacts for them to elaborate a scientific program proper to the Doctoral Schools and use PhD scholarships to fund this program. Interviewees think PhD allowances in the following year might be conditioned by their compliance with this requirement, and find in this a strong motivation to implement the new practice.

| **Mechanism 1** – Academics' belief that the allocation of financial resources depends on their compliance with the reform encourages the adoption of a new practice |
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Moreover, because they belong to the same Doctoral School, biologists and chemists have to adopt a common practice in allocating scholarships. In this case, the chemists already used the practice promoted by the reform, so biologists had to follow them. Introducing a common organizational device across epistemic communities was a Ministry decision designed to trigger practice harmonization, and was effective in this case because the Doctoral School was not just a formal structure requiring only 'ceremonial' actions, but was also the primary recipient of and decision maker about a strategic resource.

| **Mechanism 2** – Introducing a common device across epistemic communities to manage a strategic resource favors new practice adoption |
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Pressured to adopt the new practice, Biologists also performed an act of 'self-persuasion' by borrowing a positive argument from the Chemists: that "*it is not to the student to decide for the scientific policy*" (6 – Chemist). This argument was later heard again, during an interview with a biologist, from which we conclude that it had travelled from one community to the other. Thus biologists draw on another epistemic community's argument to reframe the adoption of the new practice: what was interpreted as a loss ("*we will be forced to break the moral contract with our student*" 14 – Biologist) becomes a gain ("*we regain our*

*autonomy over students on our scientific policy"*). Practice is adopted because it serves the interest of the community, and not because it complies with a top-down organizational reform. We can break down this phenomenon into two mechanisms. First:

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**Mechanism 3** – Borrowing an argument from another close professional segment supports new practice adoption.

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Second, this argument allows academics to reframe the reality leading to a sort of 'trade off' which makes new practice adoption easier:

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**Mechanism 4** – Trading off a loss for a gain supports new practice adoption.

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Finally, the adoption of this new practice could not have been completed without a new material organization. Chemists are already familiar with the practice and Biologists are aware of how chemists enact this kind of recruitment - they can see the material organization of the new practice, and can get support in its implementation from a close professional segment that is already using it.

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**Mechanism 5** – Borrowing a concrete way to implement practice from another professional segment supports practice adoption.

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*Case #2: Biologists adopted a new way of selecting PhD students by enlarging the pool to include both national and international candidates (as opposed to recruiting only local students)*

*Change* – The previous practice was to limit the pool of candidates to the local university. Biologists thus started to select candidates via a transparent formalized procedure based on impersonal criteria, rather than recruiting someone known to them from previous interactions (e.g., M2 teaching, research internship).

*Difficulties* – First, given the scarcity of PhD scholarships, academics thought they could not

afford to discourage local students: "*We hardly have enough scholarships for our own students, why would we give them to students we do not know?*" (14 – Biologist); second, recruiting a student they would not know from previous personal interactions was a risk (see Case n°1). Third, such a formal and collective selection procedure meant supervisors would lose control of the final decision: could anyone else than the supervisor be trusted to recruit PhD candidates for three years?

*Mechanisms* – During interviews, Biologists mentioned the Ministry's explicit requirement to foster mobility among students and give them the opportunity of working in different environments. From his contacts with the Ministry, the head of the Chemistry-Biology doctoral school concluded that the number of PhD scholarships the school would receive next year would be correlated to their compliance with this new recruiting method. So (as for the previous practice), the belief in possible pressures on resource played a role (Mechanism 1).

Two other phenomena supported practice adoption. First, interviews show that some academics have an argument to convince reluctant colleagues – and themselves – to adopt this new practice which highlights the advantage of having access to a larger recruiting pool, and therefore better candidates (see Table 6, quote n°7). This allowed them to see the situation from a different angle and weigh what they would gain over what they lose, confirming Mechanism 4.

As for the issue of recruiting successfully without previous knowledge of the candidate, academics decided on a threshold they would apply – that candidates must be in the first tier of their M2 class and have a good research internship evaluation. Candidates would then pass an oral examination on their future research subject. This procedure was not considered ideal - many academics pointed out during interviews that "*good grades have never meant a good researcher*" - but grades nevertheless became a pillar of the selection

procedure adopted. However Biologists did not compromise on their autonomy of judgment and created a safeguard by retaining a right of veto for the supervisor on the jury's decision: the supervisor could not choose a student who did not reach the threshold, but he could refuse to work with a student imposed by a jury decision based on a set of formal criteria. Professionals accept a solution that is not perfect to them, but they also adapt the new practice to their own requirements.

> Condition #1: The possibility for professionals to protect their autonomy of judgment from bureaucratic procedures is a condition for new practice adoption.

*Case #3 – In all professional segments, Doctoral School heads started to express a judgment on the conformity of supervision performed by their colleagues against predefined criteria (such as number of students supervised, number of years PhD took to be completed).*

*Change* – PhD supervision used to be a bilateral matter between a supervisor and his or her students, outside of any scrutiny. Following the reform, Doctoral School heads started to exert some control over their colleagues' supervision, although to different degrees.

- In the Campus A Humanities school, the dean signals the following practices as abusive during scientific councils: supervisors taking on too many PhD candidates and 'never-ending' theses. He also writes to every PhD candidates who has already taken more than 7 years, urging them to finish their theses and threatening not to allow them to register for the following year.

- At the Doctoral School of Law and Social Science (Campus A), the dean decides to take action in a conflict opposing a seventh year student and his supervisor who told him that his thesis is not defendable. She suggests to the supervisor that a third party be involved to

mediate this conflict. As a result, two academics will read the PhD thesis and give an independent advice.

- At the College of Doctoral Schools in Science (Campus B), where the thesis contract has hitherto been a standard form signed once at the beginning of the PhD, the college director decides contracts will be customized for each student and reviewed every year thus allowing the director to check each student's trajectory and identify and mediate conflicts at an early phase.

- The head of the Campus A Engineering Science Doctoral School checks on every PhD project before the official registration, and sends it back for modification when the supervisor has too many students or has a record of previous PhDs having taken too long.

*Difficulties* – Exerting normative scrutiny consists in granting oneself the right to intervene in a colleague's professional activity to notice deviance or problem relatively to a 'normal' or accepted way of doing things. Such intervention in a colleague's business is not customary among professionals. Academics, as heads of doctoral schools, had to build a legitimacy to do so. The notion of scrutiny is unknown in the Humanities school, and the dean wonders if he even has the right to block a student from registering in PhD, once they have a supervisor; while the Social Science dean expresses a sharp awareness of 'crossing a line' and doing something unusual that her colleague would certainly consider intrusive. Scrutiny is more accepted in Experimental Science, where academics are used to having to share resources and follow collective rules, but the head of the Engineering Science Doctoral School still feels the need to justify himself: "*What I am doing has surprised some people, but I am here to manage, not to be blessed by everyone*". (43 – Engineering Science)

*Mechanisms* – In all these situations, academics are not primarily pushed by coercion (not mentioned in interviews) but rather by their acknowledgement that problems such as

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supervision conditions, length of thesis, supervisor/student conflicts need to be addressed. They agree in principle with the need to act, and the reform gives them frames or devices enabling them to identify an extant situation as problematic, thus triggering the adoption of the new practice of scrutiny.

> **Mechanism 6** – The identification of extant situation as problematic and the possibility the reform offers of addressing it leads to new practice adoption.

Although coercion did not inspire the adoption of this practice, the presence of the reform's material device worked as a frame supporting that action. Formal procedures[3] introducing scrutiny could just have been adopted 'ceremonially' – i.e., without changing practices; instead, academics used them to exert scrutiny.

> **Mechanism 7** – Material devices set up by the reforms (such as monitoring tools) can be used by academics as a support to practice adoption.

Encouraged by reframing and material support, academics still need to define a role that allows interventions in colleagues' business – the more successful they are defining this role, the more efficient their interventions will be in enforcing the new norm.

Humanities Doctoral School head doubts his 'right' to act as a manager, and so limits himself to *"non-nominative remarks"*; at the Social Science school the dean is aware of 'crossing a line' and doing something unusual ("*his supervisor will probably haul me over the coals...*"). Her existing role of 'colleague' (Table 6, quote 13a) does not allow her to act, while the role of 'manager' implied by the reform is unacceptable to her. What pushes her to intervene is that she is convinced that it is the mission of the Doctoral School to mediate

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[3] a) The head of doctoral school must sign every new PhD student registration, b) a thesis contract is signed by the PhD student, the supervisor and the doctoral school upon the first year of registration and c) students registering for the fourth and later years of their PhDs must first obtain the permission of the doctoral school dean.

conflicts. She then crafts a role she describes as *"representative of the collective"*, so she can address her colleagues, not as a hierarchical manager, but as 'the voice of the collective' (Table 6 quote 13b). In contrast, the dean of the Engineering Science school relies on the role of manager, with which he is familiar from in his previous industrial career. Finally, in experimental science of Campus B, the practice of scrutiny did not exist either but the Doctoral School head felt he was legitimate to introduce it. He put forward the fact of contributing to solve conflicts by anticipation. (However, in this case the interview took place a few years after the practice had been introduced, by which time it might have become naturalized).

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Condition #2: The building of a role which is both congruent with extant professional identity and mission and the use of new practice is a condition to its adoption.

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These three examples show how academics adopted a new practice, effectively changing their way of performing aspects of their activity. We turn now to aspects of the reform that were either introduced 'ceremonially' (that is, without effectively changing practices or activities), or not introduced at all.

## 4.2 – CEREMONIAL ADOPTION

We use the term 'ceremonial adoption' to describe the situation when professionals apparently exhibit a new way of doing things, but actually stick to the bulk of their previous practices.

*Case #4 –All professional segments set up procedures for allocating PhD scholarships at the doctoral school level (on an interdisciplinary basis), but kept making the final decision within their own disciplines*

*Change* - Doctoral School set up procedures to distribute PhD scholarships as a collective,

thus symbolizing the funding of a common, cross-disciplinary scientific program. However, these procedures served as protective 'curtains', behind which extant practice persisted. What is decided at the Doctoral School level is how many scholarships each discipline will receive, based on arithmetic considerations, but the decisions as to which projects are awarded scholarships are still made within the disciplines, just as they were before the reform.

*Difficulties* – For academics, implementing this practice meant judging the quality of research projects from a different discipline than their own. For example, chemists and biologists must judge together the quality of a biology PhD project, and sociologists and jurists participate in deciding about a history student or PhD topic. Academics refused to do so because they felt they had neither the legitimacy nor the competence, just as they felt colleagues from other disciplines would lack those qualities to judge projects in their disciplines. Thus a chemist says he does not "*understand anything [about] a Biology project*", and that biologists and chemists "*do not speak the same language*" (6 - Chemist). The new practice is incompatible with how the academic profession is structured around sets of epistemic communities with strong boundaries (Knorr-Cetina 1999).

*Mechanisms* – Because they are sensitive to the resource argument (mechanism 1), but cannot make sense of the new practice, nor relate it to a problem they encounter in their everyday activities, academics decouple their symbolic behavior from their actual practice and set up a ceremonial adoption (Meyer and Rowan 1977, Fiss and Zajac 2006). They comply in a way that does not actually affect their prevailing practices. Here, the absence of reframing hinders new practice adoption. Impossibility to combine the new practice with the exercise of professional freedom and judgment led to ceremonial adoption.

*Case #5 – All professional segments organized in-class PhD training, but supervisors mostly considered training as a waste of PhD working time.*

*Change* – In-class training was organized and students' attendance was controlled (except in Humanities). But academics in charge of in-class training complained supervisors did not inform their students about its availability. "*Most supervisors don't care at all about in class training. They don't give any information to their students, some even advise them not to go and waste their time in that kind of rubish*". (27 - Historian). Some supervisors interviewed found the activity interesting but knew little about it, while others were hostile or indifferent, considering it useless, irrelevant or even a waste of time if it competed with the research effort. For them, as for their students, additional in-class training remained an administrative obligation disconnected from PhD research work and enforced by a sanction: in-class training attendance is a condition for thesis defense.

*Difficulties* – Supervisors consider they are already professionalizing their students, as this linguist underlines: "*When we were told to focus on professionalization, I was replying "wait a second... when I am teaching, I am professionalizing students!" […] As far as I know, university is supposed to train people to professions!*" This Engineering Science researcher regards professionalizing students as meaning training them to professional research standards - i.e. to make sure they have a good topic, do good research, publish, attend important conferences, build networks etc…"*I am not dealing with that [the choice of trainings]. They have English class, management, CV writing, things like that. My objective is that they get a good CV, international publications, conferences, and an interesting topic. For the rest, it is their business, they are grownups*".

While PhD unemployment is indeed perceived as a problem, in-class training does not appear as a relevant solution: some argue that it is not within their scope to play the role of a 'job

agency': they are in post to train researchers, not to be concerned with the state of non-academic job market and manage their students' integration into it. Others criticize the political choice behind the idea of in-class training: "*We know what they mean by professionalization. They mean sending students where they will never find a job, companies and things like that. They should create more academic positions instead!*" (Linguist).

*Mechanism* – As in case n°4, strong coercion combined with the absence of reframing leads to the decoupling of symbolic behavior from actual practices. This confirms the critical role of reframing, and the importance for the new practice to be congruent with extent professional mission and identity.

## *4.3 – HESITATION*

We created this category for practices that seemed like a good idea to their early supporters, but the latter self-censored themselves because they knew the new practice would be judged too far from what is legitimate, as in this case.

***Case #6 – The head of the Law and Social Science Doctoral School acknowledges the practice of collective supervision through PhD committee, but does not follow it through.***

*Change (not adopted)* – Being confronted to a supervisor student conflict after 7 years of thesis, (see case 3), the Law and Social Science Doctoral School head realizes such conflicts need to be detected earlier, and borrows from the Experimental Science schools the idea of a systematic review after 2 years of thesis. The new practice consists in generalizing an intermediary defense jury half way through the thesis, or whenever a candidate or supervisor might need it to overcome a difficulty. She adopts the practice individually, but does not try to generalize it, thinking it will conflict too sharply with extant practices and representations.

*Difficulties* – This new practice could be interpreted by academics as implying criticism of a

supervisor. In the reality, PhD students do sometimes find a 'shadow' supervisor for a part (or all) of their work, if their official supervisor is absent, unavailable, or where the two lack affinity – but such arrangements are rarely made official because they are interpreted as being critical of the supervisor. The head of doctoral school does not feel she wants to make such matters explicit through having a formal procedure such as a thesis committee: "*It would start a revolution, instantly!*" (27 – Sociologist).

*Mechanisms* – The Doctoral School head's interest for this practice was not a reaction to any kind of coercive mechanism, but stemmed directly from one of the reframing mechanisms – an extant situation viewed as problematic, and now as capable of being addressed – and inspired by proximity (borrowing an arrangement from another professional segment). Nevertheless, non adoption suggests something is missing: the reframing is only individual, and the practice gains support neither from collective legitimization, nor from coercion: and so is not adopted. Interestingly, the supporter of this practice has a strong hierarchical position, but does not draw on this strength – her role as 'colleague' prevails over that of 'manager'. Contrary to the example of scrutiny, she does not design a role that would allow her to overcome resistance and promote this new practice – underlining how reframing needs to be supported by a role congruent with new practice.

## 4.4 – REJECTION

Practice rejected is openly considered irrelevant and not implemented.

### Case #7 – Historians refuse to adopt the practice of co-supervision

*Change (not adopted)* – In Humanities, traditionally, supervision is performed by one academic. In campus A, the university management asked the Humanities Doctoral School dean to introduce co-supervision, where colleagues one senior, one junior, cooperate to

supervise a thesis on the rationale of training younger researchers to supervision.

*Difficulties* – Co-supervision is reported as "*unknown*" in Humanities, where "*the researcher is first and foremost an individual*", and "*doing research in a team is a blurry notion*" (28 – Historian). It emerged in experimental science to address a specific issue: as the context involves manipulating instruments and handling potentially dangerous substances, students must be watched closely, and one supervisor cannot follow more than two or three students by themselves. When supervisors had too many students to follow, they got help from younger researchers, who could not officially supervise research as they lacked the necessary grade[4] – and so the practice of co-supervision was born. Academics using co-supervision found the practice interesting because it allowed young researchers to get some experience in supervising research early in their career. The university management tried to 'sell' this argument to the historians, but they do not have the same problem of 'watching' too many students at the same time "*I have 8 or 9 doctoral students working around me; they do take a lot of my time, but well... Discussing, reading and commenting papers they send me, advising them to go see this or that... We meet on their request. It can be frequent, it can be irregular. It becomes more frequent as they reach the end of their theses*". *(28 – Historian).* Moreover, there is a strong individualistic stance in Humanities: academics value individual work and the fact of being able to trace 'who did what' in an article, or in a supervision. For them, a bilateral frame of supervision is positively connoted.

*Mechanisms* – Verbal pressure from the University management's on academics remained without effect. Reframing mechanisms did not apply either: unlike normative scrutiny, co-supervision does not address any problem, nor does it relate to any mission historians

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[4] "Accreditation to Supervise Research » is a grade that can be obtained a few years after the PhD, based on a peer-review of additional research work.

recognize. However, non-adoption does lead to a form of change: as the suggested practice is obviously imported from Experimental Science, it signals that Humanities' practices are somewhat less legitimate and less relevant than the latter's. It contributes to creating a feeling that their practices become marginalized: "*This idea is transmitted by the Presidency and comes from medical or technological sciences. The reason for it, after what I heard, is that a supervisor that has a lot of students around him does a poor job supervising them. And that, if there is another supervisor, the student might benefit from a better supervision. I think this is an odd reasoning. For us, the relation is more between a supervisor and his student. It comes from traditions, from different ways of working between the humanities and the sciences*". (28 – Historian)

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**Mechanism 8**: Overtly suggesting the adoption of one particular professional segment's practices contributes to delegitimizing other segments' practices.

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*Case #8 – Humanities academics refuse to make in-class training mandatory.*

*Change not adopted* — Humanities Doctoral School sets up in-class training, but unlike other Doctoral School does not make it mandatory (as required by the reform).

*Difficulties* – According to interviewees, making training mandatory challenges the basic notion of PhD candidates as autonomous adults engaged in an intellectual journey and able to make the right decisions for themselves.

*Mechanism:* The dean of the Humanities Doctoral School mentions 'pressures' to make in-class training mandatory, without effect (Table 6, quote 5). Reframing mechanisms do not help either: mandatory training do not match the idea academics have about their mission (coaching adults as opposed to training students). However, support to other segments' practices delegitimizes this segment's. By refusing to make training mandatory, the doctoral

school dean feels he is being congruent with his professional identity and mission. But he also feels he is becoming a deviant - *"We held on. Or off, I don't know!"* signals his awareness of a new norm, which neither he, nor his profession, can comply with. By contrast, the way scientific work and PhD supervision are organized in experimental science is legitimized by the reform. This confirms mechanism #8.

Below we summarize our findings in terms of mechanisms supporting practice adoption (fig. 1) and illustrate their impact by quotations or examples (table 6).

# 5. DISCUSSION – MECHANISMS PLAYING A ROLE IN PRACTICE ADOPTION

We found two categories of mechanisms playing a role in practice adoption: those depending on reformers which we labeled "vertical" and those relying on the dynamics in and across professional segments, which we labeled transversal. How they interplayed suggests academics have a strategic position in reform implementation, which reformers must not only take in account but also rely on when managing a process of change.

## *5.1 – VERTICAL MECHANISMS*

Four tools belonging to the realm of reformers triggered the adoption of new practices among academics: making threats and promises on future resources, forcing professional segments to share a common organizational device, anchoring the reform into material devices and legitimizing or delegitimizing extant practices. While the initiative to use these tools is up to the reformers, their impact was not systematic. Instead, three of them were strongly mediated by the interpretations, reactions and protections of the academics.

First, the varying impact of threats and promises on resources across epistemic communities suggests that academics made a strategic use of this coercion tool. They all knew that the total number of scholarships would not grow, so the Ministry can only act at the margin to raise or diminish the number of scholarships each Doctoral School will get. But the resource is extremely strategic for Experimental Sciences and it is realistic for them to adopt the promoted practices as they are close to their extant practices; so this argument has an echo and is often referred to as a reason to act. In Humanities and Social Sciences, the general stance is to deny the reality of this threat. This is to be correlated with the fact that these disciplines mostly do without PhD scholarships – they get PhD candidates anyway – and the promoted practices are perceived as foreign; it is not likely that academics will accept such radical change for a little of a relatively non strategic resource. Interestingly, however, the argument can be used to justify one's implication in the reform implementation and try motivating colleagues: One Humanities Doctoral School head recalls that he has had *"a ministerial pressure on my back! In Ministerial surveys, they have an item 'Doctoral School scientific program'. What will I write? At stake, our recognition, our resources, maybe the number of scholarships that will be given to us…" (28 – Historian).* He was thus promoting the elaboration of a common scientific program by the academics making up his doctoral school (a rather awkward thing in Humanities).

In the same way, common organizational device encouraged new practice adoption to the extent that academics could preserve their autonomy; otherwise it led to ceremonial adoption; and material device had an impact when academics in charge of implementing the reform decided to use them more than ceremonially.

Legitimizing extant practices has the most systematic impact – although delayed in terms of practice adoption – because of cross legitimization – by legitimizing extant practices, the reform gets legitimized in turn, because it is *de facto* implemented.

Actually, the most interesting property of vertical mechanisms is not the direct power they have over academics, but the fact that they support those willing to implement the reform. In other words, it is not as direct coercive tools that they are the most effective, but when they are taken over by academics because they think it is worth it: either because they think that they can relatively easily protect their existing resources or get more of them (Experimental Sciences); or because they fundamentally agree with the purpose of the reform (Experimental Sciences, Social Sciences and Humanities).

## 5.2 – TRANSVERSAL MECHANISMS: REFRAMING AND PROXIMITY

### 5.2.1 – Reframing

We define reframing as the fact of looking at the same situation from another angle and perceiving previously unseen aspects, thus allowing for the formulation of a fresh judgment on the situation. It relies on the fact that "Change occurs as a result of participants' reflections on and reactions to various outcomes of previous iterations of the routine" (Feldman 2000).

#### 5.2.1.1 – Figuring out a trade off

In trade-off, academics begin to acknowledge that the extant situation has faults that weigh on their activity and that they could enjoy better conditions for their activity if they could get rid of these practices. And while proposed new practices initially generated only resistance and feelings of foreignness, academics begin to see what they could offer. Reformers cannot use this mechanism on purpose: perceptions about good and bad are obviously deeply rooted in professional practitioners' knowledge and experience. Professionals must be allowed to find

their own argument for the new practices.

### *5.2.1.2 – Identifying an extant situation as a problem that needs addressing*

Never-ending theses have always existed[5], but at the practice level scholars have never addressed this situation because they would not see it as a problem. In the same vein, conflicts between supervisors and students have always arisen but no one was trying to solve them, and they would usually end up with PhD abandonment. The reform raises these questions and at the same time offers academics possible tools to address them – which encourages some academics to revive their interest in those situations and consider them as problems, requiring actions to solve them. This resembles those 'interruptions' in the course of activity which Weick noted can lead practitioners to step back and adopt a reflective stance on their own practice, opening up the possibility of change (Weick 2003).

### 5.2.2 – Proximity

In an organization comprising several professional segments, proximity refers to the situation where two of them share common characteristics in the way they are organized, the object they work on, or the issues they are confronted to. It allows professionals to be inspired by the practices of another segment that they judge close enough to them. Basically, proximity allows imitation through the borrowing of arguments and the mimicry of material arrangements. The basic principle of this mechanism is that it is relatively easier and more straightforward for professionals to imitate other professionals that they somehow identify to, than to implement the orders of an organizational hierarchy to which they find difficult to relate.

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[5] Legislative texts can be found back in 1903 trying to limit thesis lengths

## 5.3 – Conditions: Combining both types of mechanisms, protecting autonomy and making new practice and professional identity compatible

All cases of adoption relied on both vertical and transversal mechanisms. This combination seems to be a condition for practice adoption (Table 7). Moreover, the tendency or the necessity to preserve professional autonomy is an important limitation to the effect of transversal mechanisms. Reframing has an effect on practice adoption as long as the proposed practice is or can be made compatible with professionals' freedom of judgment. When they cannot protect their autonomy, professionals would rather reject a practice (if coercion is mild) or adopt it in a ceremonial manner.

Building a role suitable for the new practice is one more necessary condition to practice adoption, even when transversal mechanisms occur. Because practices relate to professional mission, the question academics ask themselves when considering a new practice is "How does this fit with my professional identity and mission?" If it does not, the questions become "Who am I when I'm doing this", or maybe "Who am I to do this?" If they cannot come up with a role that is both congruent with their professional identity and with the new practice, they do not adopt it since they cannot make sense of it. Accordingly, we observed that academics who have to occupy a position of 'manager' because of the reform – that is, heads of doctoral schools – strive to forge a role that does not exist in the academic world, that of leader, in order to act as such. By contrast, not forging a new role hinders the adoption of new

practices since academics in charge of implementing the reform cannot act as leaders (Case n°6)

## 6. CONCLUSION

Our case study shows that during the reform, new practice adoption occurred when vertical and transversal mechanisms combined. Vertical mechanisms launched the dynamic of change, but academics adopted new promoted practices only once they had performed reframing, either through figuring out a trade-off between the old and the new practice, or through perceiving an extant situation as a problem. Moreover, reframing translated into new practice adoption under two additional conditions: the new promoted practice had to preserve academics' autonomy of professional judgment, and be compatible with their existing professional role, mission and identity; otherwise new role had to be built. When these conditions could not be met, academics were able to set up ceremonial adoption in order to comply with the reform without changing their practices, or simply ignored it, when they had no incentive to comply.

Paradoxically, what looked at first like the most coercive mechanisms at the reformers' disposal (such as pressures on resources, challenging professional boundaries, introducing devices of monitoring and control) all depended to some degree on academics to become efficient in terms of practice adoption. What looked like an indirect coercive tool (legitimizing and deligitimizing of extant practices) was actually the one that is not mediated by professionals. It had an impact – delayed, but outside of any professional influence.

This review of mechanisms explains the strategic position of academics in the reform implementation. First, reframing which is entirely up to academics plays a central role in any trajectory of adoption. Second, the means that are at the reformers' disposal which we labeled

"vertical" are (for three of them) strongly mediated by the academics.

Such results suggest that a reform stands more chance to be implemented at the practice level when it is taken in charge by the professionals themselves, and when these professionals manage to build a legitimacy to act as leaders among their colleagues, this last factor being decisive.

Therefore, reformers must focus on the following points when implementing a reform:

1- They can legitimize and delegitimize extant practices – the impact being delayed but certain overtime;

2- They can trigger reframing by designing the reform so as to offer academics tools to act on problems.

3- They have to motivate academics to take charge of the reform implementation. This is triggered by one or several of the following: the reform promotes at least partly existing practices, the idea being to diffuse these existing practices to the rest of the field; reformers are close enough to the academics so as to be aware of the dormant problems identified among them; and reformers use the threat on resources towards populations who are already close to the promoted practices.

4- Finally, reformers must also design the reform so as to supply academics with tools to build a managerial stance or a legitimacy that will allow them to act as leaders, since reform implementation rely essentially on them. This crafting of a new role is part of the 'hybridization' operation (Ferlie and Geraghty 2005), critical for the implementation of a reform in a professional organization, as well as a cornerstone of professional organizations' management. How academics manage to build such a role is a critical avenue of research for understanding and monitoring change in research organizations.

Our results also suggest the limited power of reformers and highlight the "continuing limitations to reform strategies designed to achieve 'big bang' change in public service organizations" (McNulty and Ferlie 2004). Practice cannot be changed drastically and suddenly in a professionalized – such as research and higher education – organization. The reform must rely on what already exists and have reasonable objectives of slowly moving from there to the target situation. Reformers must also be able to integrate feedback of the professionals within the reform, since the more motivated the professionals will be, the more new practices will be adopted and the reform will bring change.

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# Appendices

| Campus A | Campus B | | | |
|---|---|---|---|---|
| University | U1 engineering science | U2 experimental sciences | U3 social sciences | U4 languages & literature |
| Coordination | DS College | DS College | DS College | |
| DS1 | DS1 | DS5 | DS10 | DS14 |
| DS2 | DS2 | DS6 | DS11 | |
| DS3 | DS3 | DS7 | DS12 | |
| DS4 | DS4 | DS8 | DS13 | |
| DS5 | | DS9 | | |
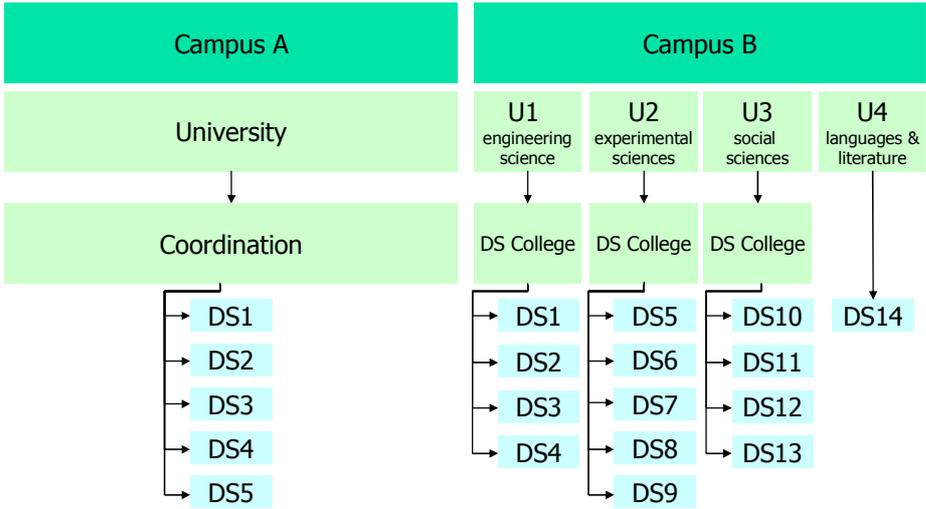
## B – Table 2: Main characteristics of doctoral schools studied

| Campus | U | DS | disciplines/topics | research centers | scholarships 2007 | PhD candidates total | PhD | average duration |
|---|---|---|---|---|---|---|---|---|
| Campus A | U1 | DS1 | Chemistry, biology | 40 | 20 | 250 | 51 | 3y 8m |
| | | DS2 | Engineering science | 9 | 14 | 208 | 39 | 3y 5m |
| | | DS3 | Computer science | 11 | 18 | 210 | 65 | nc |
| | | DS4 | Law & social science | 11 | 9 | 381 | 44 | nc |
| | | DS5 | Language and literature | 10 | 6 | 248 | 32 | 4y 8m |
| Campus B | U1 | DS1 | Electronic | 36 | 30 | 350 | 66 | 3y 1m |
| | | DS2 | Mechanics | 12 | 11 | 100 | 30 | 3y 2m |
| | | DS3 | Engineering process | 10 | 10 | 188 | 38 | 3y 3m |
| | | DS4 | Engineering organisation | 3 | 4 | 69 | 11 | 3y 4m |
| | U2 | DS5 | Chemistry, biology | 25 | 28 | nc | 64 | 3y 5m |
| | | DS6 | Physics | 30 | 25 | 277 | 60 | 3y 1m |
| | | DS7 | Maths, computer sc. | 9 | 29 | nc | 80 | 3y 6m |
| | | DS8 | Health/psychology | 18 | 15 | 200 | 41 | 3y 9m |
| | | DS9 | Geology, astronomy | 11 | 16 | 180 | 42 | 3y 3m |
| | U3 | DS10 | Management studies | 1 | 4 | 90 | nc | nc |
| | | DS11 | Economics | 3 | 3 | nc | nc | nc |
| | | DS12 | Social sciences | 7 | 11 | nc | nc | nc |
| | | DS13 | Law | 6 | 4 | 170 | 11 | 4y 10m |
| | U4 | DS14 | Language and literature | 10 | 7 | nc | nc | nc |

## C – Table 3: Interviews

| Distribution per position | City A | City B | Other | Total |
|---|---|---|---|---|
| dean's office (university president, research VP…) | 6 | 2 | | 8 |
| members of doctoral school scientific council | 19 | 6 | | 25 |
| administrative assistants | 5 | 4 | | 9 |
| Supervisors | 11 | 5 | | 16 |
| doctoral students | 6 | 14 | | 20 |
| potential non-academic employers | | | 3 | 3 |
| PhD graduates | | 6 | 1 | 7 |
| Total | 47 | 37 | 4 | 88 |

## D – Table 4: Promoted practices and their outcome

| Practice promoted: how to… | Extant practice | Promoted practice | Outcome studied |
|---|---|---|---|
| Attribute PhD scholarships: targeting topic first, then student | Best M2 student is entitled to a PhD scholarship; then she chooses a topic, which in turn gets funded. | PhD scholarship must be targeted to a topic relevant in terms of the doctoral school scientific program; then a student gets selected. | Adoption among biologists (1) |
| Attribute PhD scholarships: attributing PhD scholarships together with other disciplines | Decisions impacting the attribution of resources and implying to rank research projects are made with colleagues from the same discipline. | PhD scholarships must be attributed collectively by the pedagogic and scientific council of the doctoral school, gathering colleagues from several disciplines. | Ceremonial adoption by all (4) |
| Select PhD students: opening up the competition to national and int'l candidates | Supervisors consider local* candidates, whom they know personally from previous years.  *local=from their own university | Doctoral schools must publish funded topics on their website and open competition to national and international candidates. | Adoption among biologists (2) |
| Supervise PhD: introducing a form of public scrutiny | Supervision is a bilateral relationship between student and supervisor. The supervisor is the sole judge of what must be done. No third party is legitimate to intervene in case of conflict. | Supervision is under the collective responsibility of the doctoral school and must follow formal steps decided upon collectively. Heads of doctoral schools can intervene in a colleague's supervision. | Adoption by all (3) |
| Supervise PhD: introducing a PhD committee | Supervision is a bilateral relationship between student and supervisor. The supervisor is the sole judge of what must be done. No third party is legitimate to intervene in case of conflict. | Supervision is a collective work accomplished by a team of researchers, a 'thesis committee'. | Hesitation among social scientists (6) |
| Supervise PhD: introducing co-supervision | Supervision is done by one individual. | Supervision is done by a senior and a junior colleague, in order to train the latter | Rejection by historians (7) |
| Train PhD students: making in class training mandatory | PhD is training to research through socialization and working with their supervisor, as in apprenticeship. | PhD is training through research to academic and non academic careers. In class training is a mandatory part of PhD training. | Rejection by Historians (8) |
| Train PhD students: setting up in-class training for PhD students | PhD is training to research through socialization and working with their supervisor, as in apprenticeship. | Doctoral schools set up in-class training to professionalize PhD students for non-academic careers. | Ceremonial adoption by all (5) |

## E – Table 5: The destiny of practices

| Adoption | Ceremonial adoption | Hesitation | Rejection |
|----------|---------------------|------------|-----------|
| ⬇ | ⬇ | ⬇ | ⬇ |
| • Recruiting students from other universities<br><br>• Funding projects first then students<br><br>• Exerting normative scrutiny | • Attributing resources across disciplines<br><br>• Setting up vocational training | • Setting up a PhD committee? | • Co-supervising<br><br>• Making vocational training mandatory |

## F – Table 6-Theoretical categories illustrated by quotations/examples

**Theoretical Category - VERTICAL MECHANISM SUPPORTING PRACTICE ADOPTION**

| Sample Interview Excerpts / Example | Theoretical Sub-category | |
|---|---|---|
| 1 - "*We had a cultural difference with Chemists, which I think we managed to overcome. Chemists used to decide in advance which teams would get scholarships, but we did not like that. We wanted that scholarships be targeted on M2's best students. It became complicated to merge the two systems because they were different. So we went through heated discussions but well, we ended up finding solutions, we made it, as usual*". (Biologist, Member of Scientific and Pedagogic Council, Campus A) | Introducing common organizational device | |
| 2 - "*I think our criteria of recruitment will get tighter because the Ministry evaluates us on the length of thesis, the number of publications and what doctors do after their thesis. For the Ministry, a PhD is three years. If the PhD lasts longer, that penalizes me [as a director of research center]*". (Sociologist, Director of Research Center, Campus B) | Exerting financial coercion | Coercion |
| 3 - "*We count on 16 scholarships this year, hoping we will get more because we sent really great topics to the Ministry. We hope they will appreciate the set up of our competition, the changes we implemented to comply with their requirements*" (Biologist, Member of Scientific and Pedagogic Council, Campus A) | | |
| 4 - "*The University puts pressure on us to introduce co-supervision, through advices, letters from the vice-president, we hear that in meetings, at the University scientific council for example, it is in debate... This idea is transmitted by the Presidency and comes from medical or technological sciences, which do use co-supervision. For us, the relation is more between a supervisor and his student.*" (Historian, Head of Doctoral School, Campus A) | Supporting extant practices | |
| 5 - "*We've had pressures from the Ministry, to set up mandatory classes; we had local pressures from the University because other doctoral schools had set up mandatory classes and we had not. So we had quite a few discussions about this subject, but we held on. Or off, I don't know... (laugh)*" (Linguist, ex-head of Humanities Doctoral School) | | |

| | | |
|---|---|---|
| 6 - "*In Social Sciences, the PhD topic is not clear at the beginning. It is more something we elaborate overtime, during conversations between the supervisor and the student. Between that and a topic that is "ready-to-go" before the student starts the PhD, there is a considerable difference. That is the experimental sciences model, and we are asked to align our practice on that. It is the Science that governs the university, and we [social scientists] do not have much choice*". (Management Studies, Head of Doctoral School, Campus A) | | |

**Theoretical Category - TRANSVERSAL MECHANISMS SUPPORTING PRACTICE ADOPTION**

| | | |
|---|---|---|
| 7 - "*The idea (of opening the recruitment) is to allow the university to attract excellent candidates on specialized research topics. We do not cover all subjects with our teaching. Sometimes it is interesting to go find competencies outside*". (Biologist, Member of Scientific and Pedagogic Council, Campus A) | Figuring out trade off | |
| 8 - "*Beforehand, the scholarships were entirely targeted to the student's merit. Obviously, the student's coach in M2 had an interest to boost him, which makes that the student's merit was not only his*" (Biologist, Member of Scientific and Pedagogic Council, Campus A). | Identifying extant situation as problem | Reframing |
| 9 - "*The goal of the DS was also to raise consciousness about the PhD students' professional future. Students tended to settle down in PhD without thinking about the future, whereas we all know by now that only one third of them will integrate academia*" (Biologist, Member of Scientific and Pedagogic Council, Campus A). | | |
| 10 - "*We do have Law colleagues who take too many PhD students. It can reach 17, 18 students. Clearly, it means that these students are not supervised*" (Management Studies, Head of Doctoral School, Campus A). | | |
| 11 - "*I consider that students have no competencies whatsoever to decide for the scientific policy*" (Chemist, Member of Scientific and Pedagogic Council, Campus A) "*It seems to me that it is more important to target the scholarships toward a topic rather than toward a student. It is the supervisor who is carrying the scientific policy. So we ought to fund laboratories, not students*". (Biologist, Member of Scientific and Pedagogic Council, Campus A) | Borrowing of argument | Proximity |
| 12 -"*Our PhD students have in-class training about job market and generalist topics. We had the engineering school model under our eyes, there was no need to be a genius to see it and reproduce it!*" (Engineering Science, Head of Doctoral College, Campus B) | Borrowing of material arrangement | |
| FROM 13a - "*Who are we to impose something on our colleagues*" TO 13b - "*I intervened [in a supervisor-student conflict] using the doctoral school council as a shelter. I acted in the name of a collective, so that it does turn into an interpersonal conflict*". (Sociologist, Head of Doctoral School, Campus A) | | |
| 14"*The head of a DS is at the service of the doctoral training, of the research teams, but it is not a role of service in which we only have to give our signature to documents without reading them. My role has been to help laboratories to build excellence through the management of PhDs, to see how, through certain criteria we could help laboratories to go further. That is my experience as a manager: you have to take your responsibilities and not expect to be blessed by everyone*". (Engineering Science, Head of Doctoral School, Campus A) | Building a new role | Enabling conditions |
| 15 - "*Supervisors will choose* in fine *the student they want to work with, provided the latter has the right academic record. If the director prefers to choose someone because he knows him from beforehand, rather than an exceptional candidate, we can't stop that*". (Biologist, Member of Scientific & Pedagogic Council, Campus A) | Protecting autonomy | Enabling Condition |

# G – Table 7 – Combination of mechanisms and outcomes

|  | no reframing | reframing |  |
|---|---|---|---|
| weak coercion | **Rejection**<br>- Supervising together with junior colleague<br>- Making in class training mandatory (hum.) | **Adoption or desired adoption**<br>- Exerting normative scrutiny<br>- Cooperating accross discipline<br>- Organizing PhD committe in Social Science | → Undetermined result |
| strong coercion | **Ceremonial adoption**<br>-Attributing funding together with other disciplines<br>- Taking charge of non academic vocational training | **Adoption**<br>- Recruiting students from other universities<br>- Funding project rather than student (biology) | → Undetermined result |

↓ Hinders reform implementation          ↓ Fosters reform implementation

# H – Figure 1 – Mechanisms supporting practice adoption

1 - Exerting financial coercion

2 - Introducing common organizational device

3 - Borrowing argument

4 - Trading off loss for gain

5 - Borrowing material device

6 - Identifying extant situation as problem

7 - Translating reform into material devices

8 – Supporting extant practices
+
Conditions:
Protecting professional autonomy
Building new roles

**VERTICAL MECHANISMS**

1 – Exerting financial coercion
2 – Introducing common organizational device
7 – Translating reform into material devices
8 – Supporting extant practices     **COERCION**

**TRANSVERSAL MECHANISMS**

4 – Trading off loss for gain
6 – Identifying extant situation as problem     **REFRAMING**

3 – Borrowing argument
5 – Borrowing material device     **PROXIMITY**

**CONDITIONS**

Protecting professional autonomy
Building new roles