PROJECT-BASED FUNDING: WHAT ARE THE EFFECTS ON THE WORK OF RESEARCHERS?

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Project-Based Funding: What Are the Effects on the Work of Researchers?

Matthieu Hubert and Séverine Louvel explain how "contracting" is becoming a common activity for researchers. In addition to redefining modes of laboratory management and administration, it changes research work, workplace solidarity, and professional hierarchies. Thus, as they show in their article, this new injunction is in some measure preventing scientists and teams from developing and pursuing research strategies in the long term.

Matthieu Hubert*
Séverine Louvel**

● Introduction

In France, the transformation of the ways in which public research is funded is one of the most controversial issues among the current reforms of the national research and innovation system. In the experimental sciences, a traditionally budget-consuming sector, but also in theoretical disciplines and some fields in the humanities and social sciences, money has become "the sinews of war"[1] and its importance goes hand in hand with the rise of a project-based organization of research. Therefore, funding crystallizes the debate on how to regulate and control scientific work, and on the confrontation of managerial and professional perspectives in public research.[2]

In this article, we propose an overview of the impact this change in funding methods is having on the work of researchers. We will first present a few elements related to the importance of project-based funding in public research in France. Then, based on a review of literature and empirical investigations conducted within the framework of several studies, we will illustrate how project-based funding affects laboratory organization, transforms individual and collective strategies, changes the way researchers work on a daily basis, and reconfigures professional hierarchies. In conclusion, we will return to the conflict between profession and

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1. Séverine Louvel, "Le nerf de la guerre: Relations financières entre les équipes et organisation de la coopération dans un laboratoire," *Revue d'anthropologie des connaissances* vol. 1 no. 2 (2007): 297-322.

2. Philippe Bezes, et al., "*New Public Management* et professions dans l'État: au-delà des oppositions, quelles recompositions?" *Sociologie du Travail* 53(3) (2011): 293-348.

organization that the expansion of project-based funding has revealed, by focusing on how the boundaries of researchers' professional autonomy have evolved.

The Recent Rise of Project-Based Funding in France

Starting in the 1980s, the funding of public research in the form of grants and contracts steadily developed in many countries, particularly in Europe.[3] This growth occurred at a time when recurrent budgets were stagnating.[4] Public research became increasingly concerned with performance objectives and relevance. The latter, defined as "the expected value scientific research will have for society,"[5] has always been required of scientists, just as some researchers have historically dealt with public or private sponsors.[6] However, the requirement of relevance for public research is becoming ubiquitous and synonymous with its direct contribution to economic competitiveness and innovation.

Project-based funding relies on a bidding procedure that calls for research teams organized into a "consortium" to submit proposals. These projects are then selected and evaluated by experts (often peers), who decide to provide all or part of the funding for a specified period, in view of the completion of the announced project. During and at the end of a project, control procedures assess the quality of the work completed, through intermediate and final reports ("deliverables"), which follow formats that are most often imposed by the funders.[7]

In France, this "contractualization" of research has occurred more slowly than in other countries, but it is significant and affects most research organizations.[8] Thus, the share of project-based funding in all research (public and private) in key government funding (Higher Education and Research, Industry and Defense) rose from 11% to 21% between 1982 and 2002.[9]

The rise of project-based funding was accompanied by a differentiation of the funding instruments and a diversification of funding sources. The proliferation of money sources was due in particular to the affirmation of new public players as research funders. Thus, in 2002, government ministries only provided 41% of project funding compared to 27% from agencies such as ANVAR (National Agency for Innovation Research, which has since become OSEO), the ANRT (National Association of Research and Technology), and the ADEME (French Agency for Environment and Energy Management), and 32% from international institutions (including the European Union). Today, some local governments also contribute significant funding to public Research and Development (R&D). Finally, in addition to public funding, and especially in some areas of research, an important part of contractual funding comes from industries and associations (namely to support medical research).

Furthermore, the development of project-based funding goes hand in hand with an increasing division between research organizations (research and higher education institutions – universities and colleges: CNRS, INSERM, INRA, INRIA, IRD, Irstea, etc.) and the funding agencies

3. Benedetto Lepori, et al., "Comparing the Evolution of National Research Policy: What Patterns of Change," *Science and Public Policy* vol. 34 no. 6 (2007): 372-388.

4. John M. Ziman, *Prometheus Bound: Science in a Dynamic Steady State* (Cambridge: Cambridge University Press, 1994).

5. Laurens K. Hessels, et al., "In Search of Relevance: The Changing Contract between Science and Society," *Science and Public Policy* 36(5) (2009): 388.

6. Dominique Pestre, *Science, argent et politique. Un essai d'interprétation* (Paris: Inra éditions, 2003).

7. Aurélie Tricoire, "Externaliser la contrainte. Le dispositif de pilotage d'un projet de recherche communautaire," *Terrains & Travaux* 11 (2006): 122-139.

8. Philippe Larédo and Philippe Mustar, "Innovation and Research Policy in France (1980-2000) or the Disappearance of the Colbertist State," *Research Policy* 31 (2002): 55-72.

9. Jean Thèves, et al., "Changing Patterns of Public Research Funding in France" *Science and Public Policy* vol. 34 no. 6 (2007): 389-399.

mentioned above. The creation of agencies such as the ANR (National Research Agency) was one of the most visible examples of this new funding policy. Founded in 2005, it became a major player in research policies. The ANR was not the first French agency, but it had unmatched means and prerogatives. In 2010, their budget accounted for 8% of national public research spending. Their calls for projects were competitive, in the sense that they put proposals from different teams or "consortia" in competition with each another (on average, in 2006 and 2007, 25% of the projects were funded, but this proportion can vary considerably from one call for proposals to another). Thus, the organization of public research in France grew closer to the prevailing model abroad, which was characterized by a devolution of planning and funding functions to national agencies (the Research Councils in the UK, the German Deutsche Forschungsgemeinschaft, etc.), while implementation of the plans was entrusted to higher education and research institutions.[10] Launched in 2010 by the Ministry of Higher Education and Research, the "Investments for the Future" program (which has a total budget of 22 billion euros) reinforced this new division of roles. These competitive bidding practices funded equipment, laboratories or groups of laboratories, associations of public and private research in the field of technology, etc. The projects were driven by laboratories, institutions, or research sites. The ANR implemented the calls for proposals and monitored the projects selected. Overall, in 2011, funding allocated to "competitive" calls for proposals (the ANR and other agencies, with targeted credits dedicated as part of the Investment for the Future program) represented 20.5% of public R&D spending.[11]

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A key player in the national research and innovation system, the ANR acts as a scientific planner in all fields (to support selected research areas identified as priorities), including the social sciences and humanities (SSH). For example, in 2007, 102 SSH projects were funded through thematic calls for proposals, 42 projects through open calls for proposals (i.e. 11% of all projects funded, representing 6.8% of the total amount allocated), and finally 25 projects through "young researchers" calls for proposals (i.e. 15.8% of all projects funded, representing 12% of the total amount allocated).[12] According to the number of projects funded, SSH projects are proportionally less present in the ANR than the life sciences and materials sciences (less than 15% of the projects funded, while SSH represent approximately 28% of university faculty and researchers). There are several reasons for this discrepancy: the difficulty for SSH fields to work in project mode, since research in these fields is traditionally individual; the strong presence of university faculty members among SSH

10. Futuris, *Devenir des relations enseignement supérieur et recherche*, Association nationale de la recherche et de la technologie (National Association for Research and Technology), Paris, 2010.

11. Jacques Lesourne and Denis Randet, *La recherche et l'innovation en France* (Paris: Odile Jacob, 2011).

12. Source: 2007 annual report of the ANR.

scholars (who are probably less involved than permanent researchers from research organizations such as the CNRS in responding to calls for proposals), etc.

In France, the creation of the ANR reflected the gradual strengthening of thematic planning, which began in the 1980s and affects most European countries.[13] However, at the request of a majority of the scientific community, which mobilized against overly "tight" control by the ANR, "open" ANR funding programs increased substantially between 2008 and 2010 to reach 50% of the agency's budget. Similarly, the implementation of the "Investment in the Future" program (part of which is not dedicated), led to the increase in 2011 of the share of "non-thematic" funding in public R&D spending.[14] Thus, 42% of funds were "non-thematic" in 2011 (11 billion out of a total of 28) compared to 28% in 2006. The question of whether the strengthening of scientific planning is related to the ANR's growing influence remains unanswered. It will greatly depend on how much funding is dedicated to "non-thematic" calls for proposals.

13. Lepori et al., "Comparing the Evolution of National Research Policy," 372-388.

14. Lesourne and Randet, *La recherche et l'innovation*.

● Challenging Laboratories' Strategic Capacities and the Decline in Organizational Solidarity

What are the consequences of the rise of project-based funding on labs? First, it calls into question the overseeing of labs by their parent institutions (CNRS, INSERM, INRA, universities, etc.). While the latter still have key resources (such as research positions and research support staff), the significant drop in "recurrent funds" (or "operating funds"), which are allocated to labs to cover basic expenses (small equipment for daily operations, support activities shared by different teams, etc.) and to support research activities that do not have their own source of funding, weakens their strategic capacity – meaning their ability to influence a laboratory's scientific policies. In this sense, the increase of "earmarked" funding in project-based funding and the reduction of "recurrent" funds fit in with the "results, transparency, and evaluation" approach of the Organic Law on Financing Laws (LOLF), and are out of step with the "budget renewal" approach that prevailed before the LOLF. "By funding projects that pursue clear, pre-defined objectives that are evaluated *a posteriori*, the ANR fully embraces the approach of annual performance projects that constitute the Interministerial Mission for Research and Higher Education, and all of the finance law missions established since the LOLF came into effect."[15]

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15. Senate report on the Finance Bill, 2007.

In addition, project-based funding also affects laboratory management's ability to influence the research conducted by their teams, and to redistribute resources from one area of research to another. Indeed, in France,

public laboratories have long functioned as places that protected research projects and maintained long-term teams.[16] In this sense, the term "laboratory" does not have the same meaning it does abroad, where it refers to the physical space of experimentation (*lab work*). Individuals and teams are usually dependent on university departments that pool certain resources and set a recruitment policy for tenured professors, but that hardly ever get involved in other aspects of the teams' scientific policy (searching for funding, the definition of collective strategies, etc.). French laboratories provide researchers with a set of resources (infrastructure, equipment, support, and technical know-how, etc.) that enables them to initiate risky projects, and which ensures continuity in the themes being developed (despite the failure of a program, the departure of a researcher, etc.). Laboratory management uses the allocation of these resources, as well as the recurrent funds from the university and research institutions, to boost directions in scientific research. However, external funding (directly managed by project leaders, and "targeted" towards certain types of expenses) deprives them of leverage. Because they fund projects rather than laboratories, external financial resources thus transfer the laboratory's determination of scientific strategy to the teams (or the individual researchers), as well as the funding agencies.

16. Dominique Vinck, "La coordination du travail scientifique. Étude de deux formes spécifiques: le laboratoire et le réseau" (PhD dissertation, École des Mines de Paris, Center for the Sociology of Innovation, 1991).

The weakening of the labs' strategic capacities has also produced noticeable effects within the labs themselves. It increases the risk of thematic differences and inequalities in access to resources. Individual and collective interests do not necessarily converge in a single laboratory, given that thematic calls for projects also act as incentives for opportunism, and notably discourage the pursuit of a continuous, cumulative project monitored over the long term, in favor of strategic deviations towards research fields for which there is ample funding. Research planning by funding agencies thus leads to two opposite movements: on the one hand, an "individualization" of interests and strategies, and, on the other hand, a "collectivization" of activities (preparing submissions to calls for proposals by teams belonging to a network, whose boundaries do not coincide with those of the labs).[17]

17. Christine Musselin, "Towards a Sociology of Academic Work," in *From Governance to Identity. A Festschrift for Mary Henkel*, eds. Alberto Amaral et al. (New York: Springer, 2008), 47-56.

This individualization can lead to a loss of teamwork in a lab, a fact that can manifest itself in even the slightest attempts to pool contractual funding.[18] In France, the laboratory's protective function with regards to its teams has long extended to managing the vagaries of contractual funding (with, in particular, the pooling of all the teams' contract funding into a "common pot," thanks to which lab management was able to subsidize otherwise unfunded research programs, or determine collective scientific directions). Project-based funding encourages labs to replace the "common pot" with a limited form of sharing (taking a reduced percentage from the contracts, for instance, amounts that are no longer being used to support certain research programs, but rather to fund expenditures – maintenance, furniture purchases, secretarial work, etc. – which the recurring budgets no longer cover). Indeed, it promotes the emergence of researchers who become true professionals in contract management,

18. Séverine Louvel, *Des patrons aux managers. Les laboratoires de la recherche publique depuis les années 1970* (Rennes: Presses Universitaires de Rennes, 2011), chapter III.

and obtain a very high volume of contract resources by combining contracts obtained with different funding agencies (ANR, Europe, etc.). These researchers are becoming more and more like project managers or principal investigators (PI), who play such an important role in the United States.[19] They form a small team of essentially doctoral and post-doctoral students to work on their project, and use their contract funding to pay them. These veritable "research entrepreneurs"[20] thus achieve a virtual operational autonomy from their lab, which *a priori* does not really advocate the pooling of contracts between teams.

Project-based funding can thus lead to a "redistribution of the strategic management of research,"[21] since the local hierarchies, within the labs, lose their influence. This phenomenon is particularly noticeable in organizations for applied or technological research, where collective strategies set by the hierarchy often prevail over individual strategies. There is thus a high risk of a destabilization of laboratory organization, and a blurring of collective points of reference.

● The Difficult Adjustment of Temporalities and Scientific Priorities

Project-based funding and scientific planning have an impact on the way scientific activities are conducted. Indeed, all calls for projects, thematic or not, come with formats, or criteria, that frame research strategies. For example, some national calls for proposals require one or more industrial partners, while certain European programs require the involvement of at least three countries.

The impact of funding methods on research strategies is nevertheless mixed. This is due, on the one hand, to the variety of configurations present in the research world (from one scientific community to another, from one institution to another, etc.), and, on the other hand, to the ambivalence of researchers towards these new funding methods. Indeed, whether or not they adhere to the principles of project-based funding, most researchers are forced to abide by it in order to pursue their activities. They must thus take into account the dictates and constraints brought on by this type of funding. For instance, this is the case for researchers in nanoscience, a field of activity that has been heavily promoted and structured by multiple funding tools for more than a decade. Studies show that the proliferation of mechanisms, information, and incentives leads researchers to produce work that interprets and "builds meaning," which has a greater tendency to emphasize the continuing diversity of their practices and representations, rather than their adherence to the principles and standards promoted by the program. Studies show that the proliferation of mechanisms, information, and incentives leads researchers to emphasize the enduring diversity of their practices and representations, rather than their adherence to the principles and standards promoted by the program. [22]

Moreover, with regard to competition and acceptance rates, qualitative studies show that researchers submit projects that are already underway,

19. Richard B. Freeman et al., "Careers and Rewards in Bio Sciences: The Disconnect between Scientific Progress and Career Progression," *The American Society for Cell Biology* 53 (2001).

20. Finn Hansson and Mette Mønsted, "Research Leadership as Entrepreneurial Organizing for Research," *Higher Education* vol. 55 no. 6 (2007): 651-670.

21. Morgan Jouvenet, "Profession scientifique et instruments politiques: l'Impact du financement 'sur projet' dans les laboratoires de nanosciences," *Sociologie du Travail* vol. 53 no. 2 (2011): 240.

22. Matthieu Hubert, Francis Chateauraynaud, and Jean-Michel Fourniau, "Les chercheurs et la programmation de la recherche: du discours stratégique à la construction de sens," *Quaderni* 77 (Winter 2011-2012): 85-96.

for which they can already demonstrate interesting results.[23] By doing so, they make a distinction between "sustenance" projects and more exploratory projects. The former, having already provided evidence of their fruitfulness, are reassembled, reworked, or simply updated in order to increase the sources of potential funding. The latter require advance preparation work to assess the potential of a relatively unexplored area of research. Often, researchers believe that the agencies do not adequately fund these exploratory projects, and they denounce the increasingly maintained support of planned and applied research, to the detriment of research that is presumably more basic, but whose results are not predictable.

Thus, despite the incentives of public policies to reconcile basic and applied research, researchers still find "basic research" meaningful.[24] However, as Jane Calvert demonstrated, it takes on different meanings depending on the situations and arguments being made.[25] Sometimes it refers to more uncertain and riskier research that provides fewer preliminary results – which, for planned research, means promises of future results. It can also refer to research that requires a more flexible or distant timeframe. According to researchers, such research should be funded by recurring funds (or funds redistributed among a laboratory's teams). It also comprises research based on specific evaluation methods, leading researchers to argue that "basic research" projects can only be assessed *a posteriori* (whereas project-based funding is granted based on an *a priori* scientific assessment). More generally, it is not just the relevance of *a priori* assessment of "potential" results, but also the effectiveness of *a priori* assessment of the resources needed to conduct the research that researchers are strongly challenging. Indeed, the future needs and expenses of a project (the types of equipment, instruments, staff, and partners) depend on the project's progress and are therefore difficult to predict.[26]

This funding system, which is considered to be incompatible with the constraints of more exploratory and uncertain research, reveals how basic research, which is perceived as less effective, has experienced a loss of legitimacy. Researchers (particularly the most experienced) point out, for example, how the ways of presenting and promoting scientific work have evolved: increasingly, researchers (in particular the young ones) emphasize its applications (even remote), the patents that have been filed, the involvement of industrials, or the interdisciplinary quality of the project. One can therefore wonder whether project-based funding will lead, in the medium term, to a comprehensive restructuring of public research around the major areas of application (health, energy, etc.) at the expense of disciplinary research. Although the situation is different for each field of research, such a perspective, which assumes that researchers can position themselves within an application-based framework, is already a reality for a number of specialties, particularly the experimental ones, for which the application possibilities seem more "natural" (materials science, molecular biology, etc.). Furthermore, while

23. Matthieu Hubert et al., "Les chercheurs et la programmation," 85-96.

24. Pierre Joliot, "Recherche fondamentale et recherche appliquée," in *La mondialisation de la recherche* (Paris: Collège de France "Conferences," 2011), http://conferences-cdf.revues.org/301.

25. Jane Calvert, "What's Special about Basic Research?" *Science, Technology and Human Values* vol. 31 no. 2 (2006): 199-220.

26. From this perspective, not even the bibliography can be completed until the initial results (experimental, for example) have been obtained.

the government's demonstrated objective to move away from disciplinary compartmentalization and encourage interdisciplinarity is relatively consensual, the modes of their implementation must be invented on a case-by-case basis (in particular because of the difficulties inherent to interdisciplinary work as well as the hyper-specialization of contemporary sciences).[27]

Project-based funding and planning seem to favor short-term adjustments, to the detriment of a sustained and prolonged scientific strategy, for which results may be slow to appear.

Finally, the question of timeframes is crucial to understanding the effects of project-based funding on scientific strategies. Indeed, researchers have to deal with the different schedules of a project-based way of operating in order to meet the pace and deadlines imposed by agencies or funders. These constraints are related in particular to deadlines set in advance, regardless of the project (usually three or four years, with interim reports every six months or every year), which do not take into account the actual duration of the projects. Thus, the differences in timeframes can pose organizational and strategic problems when it comes to aligning the timeframes and goals of each researcher, team, and funding agency involved. For example, the constraints of a doctoral student's scientific project and his/her academic requirements do not necessarily coincide with those of the collective project in which he/she is involved. More generally, project-based funding and planning seem to favor short-term adjustments, to the detriment of a sustained and prolonged scientific strategy, for which results may be slow to appear (or for others to understand the benefits, and use them in their own work).

27. Peter Weingart and Nico Stehr, eds., *Practising Interdisciplinarity* (Toronto: University of Toronto Press, 2000).

● Work Entangled in Red Tape

The notion that research is no longer an intellectual and solitary activity is not new. In 1971, Jerry Ravetz was already describing an "industrialization" of scientific work which he defined as follows: "the social atmosphere becomes increasingly 'industrial' where a large organization, with labour force directed to specialized tasks, produces the sorts of results for which the directors have been able to obtain contracts from agencies which invest in such production"[28] Other authors have also described an "asymmetrical convergence" between public and private research,[29] characterized not only by the reciprocal borrowing of operating methods, but also by an ultimate predominance of standards (rationalization, performance, profitability, etc.) from the private sector.

The rise of project-based funding has emphasized certain forms of "industrialization." In everyday life, the confrontation between professional and managerial approaches can notably be seen in the inflation of administrative management tasks, some of which are at the heart of research activity, while others fall into the category of bureaucratic

28. Jerome Ravetz, *Scientific Knowledge and Its Social Problems* (Oxford: Oxford University Press, 1971): 22.

29. Daniel Lee Kleinman and Steven P. Valls, "Sciences, Capitalism, and the Rise of the 'Knowledge Worker': The Changing Structure of Knowledge Production in the United States," *Theory and Society* vol. 30 no. 4 (2001): 451-492.

routine.[30] The former involves the monitoring and setting up of projects: participating in various commissions and committees that distribute funds, researching information about the programs, their evaluation criteria and the odds of receiving approval, looking for partners and building networks or "consortia," as well as all the work involved in shaping the scientific projects to be submitted for evaluation. The choice of partners is proving to be very strategic, not only in terms of functional complementarity, but also in terms of visibility, recognition, and the possible ownership of the results by partners outside the academic world.

30. Aubépine Dahan and Vincent Mangematin, "Recherche ou temps perdu? Vers une intégration des tâches administratives au métier d'enseignant-chercheur," *Gérer et Comprendre, Annales des Mines* 102 (2010): 14-24.

Other more peripheral practices, namely those devoted to more routine monitoring of the project, lead to a workload that leaves little time for other activities considered more strategic, or central, to a researcher's activity: justifying expenses, mobilizing partners to organize progress meetings or to produce project progress reports, reporting on the activities completed according to the formats pre-established by the funding agencies, etc. These accountability requirements,[31] which are meant to make organizations transparent and accountable, are a burden on the work of tenured researchers, who devote an increasingly large part of their daily activity to them.

31. Daniel Neyland, "Achieving Transparency: The Visible, Invisible and Divisible in Academic Accountability Networks," *Organization* vol. 14 no. 4 (2007): 499-516.

● Rearrangement of the Division of Labor and New Professional Hierarchies

Project-based funding brings with it new forms of division of labor within projects: tenured researchers look for funding and manage the relationships with partners and funders, while non-tenured researchers are confined to the concrete progress of scientific lab work (lab work, experiments, taking samples or doing field surveys, programming models, conducting simulation tests, etc.). In this organization of collective work, doctoral students are seen less as students than as junior researchers. They actively participate in the implementation of joint projects. The use of postdoctoral researchers (who long had a minor role in France compared to abroad, and only in a few fields like the life sciences) is becoming more widespread. This means their status now has to be reevaluated; they must be seen as professionals in their own right who are vital to the functioning of laboratories and who accumulate experience, and not just as young faculty members waiting for a tenured position in higher education or research.

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Along with this change comes the establishment of new divisions of labor between, on the one hand, researchers who design and lead

research projects, and, on the other hand, project support staff (large instruments, shared databases, platforms, and technical facilities that are less dependent on laboratories and have their own more or less scientific objectives). The activity of the latter group is thus funded by research contracts obtained by the former; the amount of contract funding they accumulate thus indicates how much scientific authority they have in their lab, their institution, and their networks. On another level, scientists who are actively involved with funding agencies (such as scientific authorities, members of the planning committees in charge of foresight activities, defining the themes of the calls for proposals, and evaluating the projects submitted) form a small scientific "elite" that plays an important role in research planning, and on whom researchers depend, especially given that the sources of funding are not very diversified.[32]

Finally, taking advantage of the opportunities offered by information and communication technologies (which, it may be noted, is in many respects necessary for a project-based functioning of science), the major funding programs, particularly in Europe, require the involvement of partners of different nationalities, including partners from nations in the South. This requirement contributes to the internationalization of scientific work, but the "peripheral" partners are often integrated as subordinates, and do not always have their say in the overall direction of the projects in which they take part.[33] Such forms of division of scientific labor at the international level raise questions, as they distance researchers in developing countries from concerns and scientific research whose results would be likely to benefit the societies in which they work.

● Conclusion

Overall, the relatively recent expansion in France of project-based funding for public research produces highly visible effects on the work of researchers. Most of these effects are produced by the very procedure of funding through competitive proposals; they include a loss of strategic capacity for the labs, the decline of organizational solidarity, and the bureaucratization of the work of researchers. Certain consequences, such as a loss of legitimacy for "basic" research or the transformation of professional hierarchies, are reinforced by research planning – which is unevenly developed depending on the field – and project-based funding's emphasis on select priority thematic areas.

These changes raise serious debates about the future of the autonomy of researchers and the challenges they face in defining and conducting their research. Some surveys do indeed show the strong constraints that project-based funding and/or research planning inflict on individuals or teams that have fewer resources (depending on the case, a smaller network of collaborations, less academic prestige, or a disadvantaged position in the international division of labor[34]). While some studies talk of a "de-professionalization" of the academic world, marked by the intrusion of project-based funding's managerial practices into the "reference points of professional recognition,"[35] other research highlights the difficulty of

32. Richard Whitley, "Reconfiguring the Public Sciences: The Impact of Governance Changes on Authority and Innovation in Public Science Systems Reconfiguring Knowledge Production," in *Changing Authority Relationships in the Sciences and Their Consequences for Intellectual Innovation*, eds. Richard Whitley, Jochen Gläser, and Lars Engwall (Oxford: Oxford University Press, 2010), 3-47.

33. Pablo Kreimer and Juan Pablo Zabala, "'Quelle connaissance et pour qui?' Problèmes sociaux, production et usage social de connaissances scientifiques sur la maladie de Chagas en Argentine," *Revue d'Anthropologie des Connaissances* vol. 2 no. 3 (2008): 413-439.

34. Respectively: Mary Henkel "Academic Identity and Autonomy in a Changing Policy Environment," *Higher Education* 49(1/2) (2005): 155-176. Liudvika Leisyte et al., "The Freedom to Set Research Agendas: Illusion and Reality of the Research Units in the Dutch Universities," *Higher Education Policy* 21(3) (2008): 377-391; Kreimer and Zabala, "Quelle connaissance et pour qui?" 413-439.

35. Morgan Jouvenet, "Profession scientifique et instruments politiques: l'Impact du financement 'sur projet' dans les laboratoires de nanosciences," *Sociologie du Travail* vol. 53 no. 2 (2011): 240.

putting forth such conclusions, since the principles of action of professionalism have not been weakened so much as "redefined" by these project-based funding practices.[36]

Finally, one might add that the debate on autonomy is often obscured by a vague and ambiguous definition of the concept, as it takes on very different meanings depending on its context of use. For example, researchers use the autonomy argument to keep funders at a distance when they interfere with the establishment of research strategies and impose excessive constraints on scientific work. For policy makers, the same concept combines the possibility for researchers to define their own scientific agenda with a reinforced external supervision of their activities and results.. Even within the "scientific community," one can infer that the meaning given to autonomy is highly dependent on the different ways of viewing and conducting research, on the "epistemic cultures"[37] in which scientific work takes place, and on the constraints imposed on researchers, as well as the resources (material or symbolic) they can mobilize.[38] Thus, a vast investigation remains to be conducted in order to characterize project-based funding's impact on the professional autonomy of researchers in more detail. ●

36. Julien Barrier, "La science en projets: financements sur projet, autonomie professionnelle et transformations du travail des chercheurs académiques," *Sociologie du Travail* vol. 53 no. 4 (2011): 515-536.

37. Karin Knorr Cetina, *Epistemic Cultures: How the Sciences Make Knowledge* (Cambridge, MA: Harvard University Press, 1999).

38. Matthieu Hubert, Morgan Jouvenet, and Dominique Vinck, "Politiques 'de l'innovation' et transformations des mondes scientifiques. Le pari des nanosciences et nanotechnologies à Grenoble," in *Les politiques de recherche entre État, profession et marché*, eds. Jérôme Aust and Cécile Crespy (Paris: Éditions des Archives Contemporaines, not yet published).