Europe's New Scientific Elite

Social Mechanisms of Science in the European Research Area

Barbara Hoenig

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This book examines the question of whether the process of European integration in research funding has led to new forms of oligarchization and elite-formation in the European Research Area. Based on a study of the European Research Council (ERC), the author investigates profound structural change in the social organization of science, as the ERC intervenes in public science systems that, until now, have largely been organized at the national level.

Against the background of an emerging new science policy, *Europe's New Scientific Elite* explores the social mechanisms that generate, reproduce and modify existing dynamics of stratification and oligarchization in science, shedding light on the strong normative impact of the ERC's funding on problem choice in science, the cultural legitimacy and future vision of science, and the building of new research councils of national, European and global scope.

A comparative, theory-driven investigation of European research funding, this book will appeal to social scientists with interests in the sociology of knowledge.

Barbara Hoenig is Postdoctoral Researcher at the Institute of Education & Society of the University of Luxembourg. She obtained her qualifications in sociology at the University of Graz (Diploma 2001, PhD 2009) and the University of Innsbruck (Habilitation 2016). She has published on the sociology of science and knowledge, the history of social sciences, social inequalities and European integration.

'Hoenig's case study is a major contribution to the sociology of science and knowledge. Based on rich empirical material and within an advanced theoretical framework, Hoenig demonstrates the consequences of European science policy, especially with respect to the formation of new scientific elites and the impact on the cognitive content of research.'

—Gerald Angermann-Mozetic,
Karl-Franzens-Universität Graz, Austria

'Science studies has generally neglected how funding arrangements construct hierarchies within science and establish particular meanings of research excellence that position and (dis)place other possible meanings. With great nuance, Barbara

Hoenig reveals the detailed politics of knowledge construction underlying the European Research Council in what is the first major study of 'Europe' as a project of scientific integration. This is a superb and timely book.'

—John Holmwood, University of Nottingham, UK

'Science, including social science, has usually been at least partially international in the scope of its operations, but international linkages and collaborations have been largely personal or have involved fragile organisational ties. The institutional initiative studied here, the ERC, endeavours to scale-up European science to operate at a formal supranational level. Barbara Bach-Hoenig's study deploys a magnificent array of theoretical and empirical resources to study its early operation.'

—Charles Crothers, Auckland University of Technology, New Zealand

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The sociology of knowledge has a long and distinctive history. Its function has always been that of attempting to bridge the aspirations of the discursive and institutional founding fathers of sociology with that of modern attempts to define the discipline through the study of the emergence, role and social function of ideas. However, since Mannheim first outlined his programme in the 1920s, the sociology of knowledge has undergone many changes. The field has become extremely differentiated and some of its best practitioners now sail under different flags and discuss their work under different headings. This new series charts the progress that has been made in recent times – despite the different labels. Be it intellectual history Cambridge-style, the new sociology of ideas which is now gaining strength in North America, or the more European cultural analysis which is associated with the name of Bourdieu, this series aims at being inclusive while simultaneously striving for sociological insight and excellence. All too often modern attempts in the sociology of knowledge, broadly conceived, have only looked at form while they downplayed or disregarded content, substance of argument or meaning. This series will help to rectify this.

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Abbreviations

AER	French Research Evaluation Agency; *Agence d'Evaluation de la Recherche*
ANR	French National Research Council; *Agence Nationale de Recherche*
ANVUR	Italian Agency for University Research Evaluation
AS	Analytical Sociology
AT	Austria
BA	Bachelor degree
BEC	Bose–Einstein–Condensate
CERN	European Organization for Nuclear Research
CH	Switzerland
CNR	Italian National Research Council
CNRS	French National Centre for Scientific Research; *Centre National de la Recherche Scientifique*
COST	European Cooperation of Science and Technology funding programme
CPP	Citations per publication
CSA	Coordination and Support Actions of the ERC
CUN	Italian National Council of Universities
CV	Curriculum vitae
CZ	Czech Republic
DBO	Desires, beliefs, and opportunities
DE	Germany
DFG	German Science Foundation
Doc	Habilitation degree
EHESS	French School for Advanced Studies in the Social Sciences
EI	Excellence initiative
ENS	French *École Normale Supérieure*
ERA	European Research Area
ERA-NET	European funding programme for public research networks
ERAWATCH	European Commission's information platform on European, national and regional research systems and policies
ERC	European Research Council

ERCEA	Executive Agency of the European Research Council
ERCEG	Expert Group of the European Research Council
ES	Spain
ESF	European Science Foundation
ESO	European Southern Observatory
EU	European Union
EU13	13 'new' members of the European Union (post-2004)
EU15	15 'old' members of the European Union (pre-2004)
EU28	All 28 member states of the European Union
EuroHORCS	European Union's Research Organizations Heads of Research Councils
FI	Finland
FNSP	French National Foundation for Political Science
FP7-IDEAS	Sub-Programme 'Ideas' of the Seventh EU Research Framework Programme
FR	France
FTE	Full-time equivalents
GDP	Gross domestic product
HLEG	High-Level Expert Group
HR	Croatia
HU	Hungary
IDEX	French excellence initiative
INRA	French National Institute for Agricultural Research
IT	Italy
KNAW	Dutch Royal Academy of Science
LENS	European Laboratory in Non-Linear Spectroscopy
LS9	ERC panel 9 of the life sciences (applied life sciences and non-medial biotechnology)
MA	Master degree
max	Maximum value
mean	Mean value
min	Minimum value
MPS	German Max Planck Society
MSC	Marie-Skłodowska-Curie Action programme for individual researchers
n	Number of researchers
NGO	Non-governmental organization
NIH	American National Institute of Health
NL	The Netherlands
NPM	New Public Management
NSF	US National Science Foundation
NWO	Dutch Science Council
OECD	Organization for Economic Cooperation and Development
P	Number of publications
p5	Highest-cited 5 per cent of all publications

p10	Highest-cited 10 per cent of all publications
p25	Highest-cited 25 per cent of all publications
PE2	ERC panel 2 of the physical and engineering sciences (fundamental constituents of matter physics)
PE4	ERC panel 4 of the physical and engineering sciences (physical and analytical chemical sciences)
PhD	Doctoral degree
RAE	UK Research Assessment Exercise
REF	UK Research Excellence Framework
RFP	Research Framework Programme of the European Union
SE	Sweden
SG	ERC Starting grant
SH1	ERC panel 1 of the social sciences and humanities (economics, finance, management)
SH2	ERC panel 2 of the social sciences and humanities (sociology, anthropology, political science, law, science studies, communication science). In 2016, sociology as an addressed discipline moved to SH3.
SH6	ERC panel 6 of the social sciences and humanities (archaeology, history)
SNS	Italian *Scuola Normale Superiore di Pisa*
SSK	Sociology of scientific knowledge
StDv	Standard deviation
STEM	Science, technology, engineering and medicine
STS	Science and technology studies
UK	United Kingdom
UNESCO	The United Nations Educational, Scientific and Cultural Organization
US	United States
VSNU	Dutch Association of Universities
WoS	Web of Science database

1 Introduction

When Helga Nowotny, former President of the European Research Council (ERC), was asked to describe what constitutes scientific excellence in Europe, she replied that one recognizes excellence by encountering it (Nowotny 2012: 13). Her saying reminds us of the fact that research of outstanding quality has to be validated and recognized by others in a peer review procedure. How scientists of high eminence communicate and judge their colleagues' work and how their intellectual authority operates tells us a lot about what constitutes scientific 'excellence'. What remains less clear in that description, however, is whether the recognition of excellence depends on a researcher's scientific talent, performance and merit alone, or whether it results from having access to outstanding conditions of work.

'Evocative environments' (Zuckerman 1977) involve the presence of teachers and colleagues talented in invoking excellence in others, in which researchers enjoy the opportunity to learn, producing research of high quality. In addition, we may envision different types or styles of 'excellence', varying by disciplinary traditions and country-specific institutional frameworks, not necessarily reflected in narrowly defined productivity indicators of university rankings. Our measurements of scientific quality may simply be distorted in reproducing certain biases of language, publication culture and research paradigms, and are thus inadequate for reflecting intellectual variety and openness that is a prerequisite of any innovative knowledge production in science. This also refers to how the excellence label symbolically operates in broader public discourse, being effective as a signal justifying public sponsoring for research, simultaneously cutting subsidies for others losing in that process. Which meaning do recent 'Excellence Initiatives' (EIs), both at national and supranational level, enfold in a context of resource reduction at most public universities, particularly in Europe?

My research mainly consists of a case study scrutinizing the ERC as a new institution of research funding for 'excellence' at supranational level. At first sight, its potential importance may well be hidden, since both in historical and in quantitative terms its scope remains rather limited. Founded in 2007, the institution's history now is a decade old (European Commission 2007). Quantitatively, researchers engaged with the ERC activities, either as its representatives, as panellists or as grantees, jointly comprise about 1 per cent of the total research

capacity of all eligible researchers in the European Research Area (ERA).[1] Nevertheless, the institutionalization of the ERC is regarded as considerably relevant for the entire scientific community.

First and foremost, the ERC with its grant system is of apparently *strong normative impact* on the cultural legitimacy and social stratification of science. It sets new standards for reputation and reward for researchers and research activities in the scientific community of Europe and beyond. By establishing that supranational funding institution, the European Commission thus creates the opportunity to influence the content of research on a broader scale than ever before. While former programmes for promoting European collaboration among scientists and scholars were led by the idea of transnational cooperation, the new institution explicitly follows the idea of scientific 'excellence' alone as the singular, sole criterion for promoting science. It thus aims at the heart of defining what counts as knowledge of 'excellence', as well as fundamentally shaping future visions of science and research.

Second, the ERC certainly is a major *institutional invention*. As a case of supranational institution-building, it marks a new stage of research funding when compared to the history of European policies developed in the decades before. For the first time it introduces a supranational institution in possibly conflict-ridden relation to nationally structured research systems. Taken as a case of Europeanization of science, the adding of the supranational level and the crucial tension of national versus European levels of science systems generates interesting questions for research. The political and economic unit of the European Union (EU) itself is usually regarded as a multilevel system of intertwining institutions and other actors of science. With the recent economic crisis and even damage of public science systems in several European countries, supranational funding increasingly becomes subject to great expectations of universities and research institutes. While previous European funding programmes presupposed a collective entity such as a research institution in order to be eligible for application, the ERC supports promising individual researchers, particularly early career ones, by helping them to build their own research team, strengthening their position vis-à-vis universities. Thus, the institution of research funding seems to be a well-suited object for studying the Europeanization of science more closely, at the macro-, meso- and micro-level of research activities.

Third, the ERC definitely *affects the building of new research councils* of national, European and global scope as well. Recall that since 2012 an initiative for the founding of a Global Research Council[2] had strong resonance in the worldwide scientific community. Aiming at fostering transnational research and cooperation across continents and for the benefit of developing and developed countries, representatives of scientific, administrative and economic organizations take part in articulating strategies for multilateral research governance and funding. In that way, experiences of the ERC may well be of high political significance to other contexts of science policies as well, considerably expanding an exclusively European focus towards global perspectives of research.

Fourth, funding by the ERC definitely has *practical consequences* of considerable material impact for individual researchers and universities proving

successful in grant competition. Governance of research policies at supranational level introduces new opportunities of affecting problem choice, allowing for much innovative research to be developed on problems of wide public interest. Although, we doubt that multifold expectations towards European funding can actually be realized. It may well be necessary for research policies to acknowledge potential unanticipated consequences of their measures as well. Unintended effects may sharpen social stratification in research to such an extent that this counteracts and converts fundamental standards and objectives of science and research in the EU itself.

The problem: establishing 'excellence' in socially stratified science

With the historical invention of peer review, science has institutionalized its self-steering procedure of 'organized scepticism' (Merton 1968b: 614, initially 1942), regulating the core process of judging knowledge claims for accumulating scientific knowledge. In that regard, public universities and research institutions are considered different from norms and rules of other institutionalized fields. At stake is the effective operation of peer review as a core procedure of institutionalized quality control and as the central self-regulative mechanism of science.

Nevertheless, issues of scientific integrity and research productivity have always been dealt with differently in historical periods or regimes of science. With the increasing relevance of market-oriented forms of integration and governance among academic institutions, peer review can be seen as the last remaining area in which scientists follow genuinely scientific, self-steering rules of decision-making on each others' knowledge claims (Clark 1983: 136ff). An alternative view more critically questions whether peer review and other forms of scientific evaluation are really unbiased by an increasing marketization of science or whether we face a process in which legal–administrative rules and economic norms have already begun to substitute scientific ones (for instance, Guston 2000).

Grant peer review applied in the area of research funding is a particular case in that regard. As a certain type of social action, research funding has been traditionally defined in the relationship between the state and the scientific community alone, without any intermediate forms of institutions and social groups. This has fundamentally changed with the application of New Public Management (NPM) principles to the entire sector of science and research. The central trust in the self-regulatory power of science which constituted a 'social contract for science' from 1945 to the early 1980s, has been diminished or at least began to erode since then (Guston 2000). This process could be observed in many knowledge-based societies in Europe as well, albeit with some delays. Public funding has also become more demanding and competitive by claiming to enhance funding efficiency to meet certain policy-goals in a cost-effective way. In particular, for European universities (Harding *et al*. 2007; Holmwood 2011), traditionally more reliant on public funding than those in other knowledge societies globally, these changes are highly relevant.

What is organizationally new, in terms of institution-building, is the emergence of supranational governance for research funding, as manifest in the ERC. Since in the sharp peer review process of ERC proposal applications, scientific 'excellence' is considered as the sole criterion of evaluation, the competition is linked with much symbolic capital for winners, dominating both its public perception and an emerging rhetoric as well. Conversely, cumulative consequences for those losing in that competition and the costs of the evaluation procedure itself are not taken into account to a similar extent. The practical alternative for researchers to winning an ERC grant in many system contexts, characterized by enforced competition even for temporary contracts among the scientific precariate, may well be to quit doing research at all, in favour of teaching and administrative jobs. In addition, it remains unclear which meaning national and supranational EIs enfold in a context of already stratified science, increasing reduction of public funding for universities, and the continuing adaptation of lower-level funding schemes to the standards of the internationally most highly qualified.

Many of the potential bearers of the new brand 'European excellence', while enthusiastically called by the European scientific–administrative elite or a local university rector to participate in what is sometimes perceived as an actual lottery, may well find themselves excluded on grounds not exclusively caused by scientific quality and originality. Decision-making sharpened by excessive competition may possibly be affected by either gaining or lacking other, albeit functionally irrelevant, statuses and resources such as social network ties, membership in reputed institutions or the accumulation of previous symbolic awards. Since the running of evaluative processes is cost-intensive and bound to available resources, the ERC has already begun to enforce rules for resubmitting proposals. This leads to an effective prior exclusion of those who have tried once, but were not immediately successful; the opportunity to generate learning among researchers is thus effectively restricted.

Therefore, there are good reasons to assume that the emergence of a new elite of researchers embodying 'European excellence' is accompanied by a range of social mechanisms of oligarchization and closure among the scientific community, restricting access to resources necessary for continuing research. The rhetoric of 'excellence' incorporated both in European and national science policy documents exclusively seems to be geared to the meritocratic principle of selecting the most talented among all applicants for grants. On the other hand, members of the scientific community themselves speculate that procedures of grant peer review might be subject to a massive 'Matthew Effect' (Merton 1968a, 1988).[3] Dynamics of cumulative advantage and disadvantage in gaining scientific recognition may partially explain a strong concentration of grants in only a few countries and institutions of Europe (Nowotny 2012; HLEG 2015: 30ff). In turn, social scientific research encounters several problems when trying to provide evidence for mechanisms of particularistic resource allocations and its cumulative effects.

What is at stake is an encompassing structural transformation of the entire research landscape at several levels, which can be characterized as an Europeanization process of science and research. The ERC as a supranational funding

institution is best suited for empirically investigating that multifold landscape and the dynamics of scientific elite-formation is also involved. I aim at outlining structurally induced conflicts among actors of different interest and scope, their strategies to tackle these conflicts, and social mechanisms involved that mediate, aggregate and transform these multilevel actor constellations. Of particular interest is which conditions, criteria and consequences are constitutive of elite-formation and maintenance among the scientific community. These processes are theorized by explaining underlying social mechanisms that generate social stratification in science in a variety of cultural and social contexts.

Research question, concepts and theses

Based on a structural analysis in the tradition of Robert K. Merton,[4] while also referring to recent Analytical Sociology (AS),[5] the research aims at explaining self-enforcing dynamics of research funding as one outcome of European integration in science. Taking the ERC as an example, I show how supranational funding contributes to the overall structural transformation of European research and in particular to the formation, maintenance and reproduction of a certain elite stratum of researchers of the most eminent scientific 'excellence'. In developing a middle-range theory of Europeanization I draw special attention to the institutional structure of European science in a cross-culturally comparative view. Manifest in the politically proposed idea of the ERA,[6] supranational research funding was explicitly supposed to transform previous relations between actors competing for resources, for instance between national ministries, regional universities, local research teams, as well as between single researchers and their respective institution.

That European research funding intervenes into public science systems which, up until now, have been mostly organized at national level, thus simultaneously transforming traditional structures of research governance, is discussed by assuming an oligarchization process generating a new *scientific elite*. Sociological scholars reflect the formation of elites (Mills 1956), and particularly of scientific elites (Elias *et al*. 1982; Bourdieu 1988; Münch 2014), by referring to institutional processes of social closure (Weber 1978) and cumulative dynamics of symbolic reputation (Merton 1968a, 1988; Zuckerman 1977). The latter are highly relevant for sharpening social stratification in science (Cole and Cole 1973; Cole 1992) by forming a transnational elite of European 'excellence'.

The concept of *social mechanism* is useful for deepening an understanding of oligarchization dynamics in science, when applied to a macro-level of social analysis. I provisionally define social mechanisms to designate 'recurrent processes generating a specific kind of outcome or event' (Mayntz 2004: 237). Initially introduced to sociology by Merton, the notion has recently gained prominence in AS. While the latter has developed independently of the sociology of science, its core proponents frequently continue to refer to central aspects of Merton's oeuvre. In favour of constructing rather abstract models, however, AS has largely failed to realize a more empirically accentuated middle-range theory capable of

specifying mechanisms typical for certain institutions of social life, such as scientific research.

In order to explain elite-formation, I particularly relate mechanisms to *social institutions* and dynamics of institutional reproduction. Merton's general social theory is particularly useful for explaining how institutions are maintained and for reconstructing self-reinforcing dynamics, such as those of resulting in a Matthew Effect of scientific reputation and reward. The thesis I empirically examine is that of a supposed *Europeanization* in research funding, indicating the decreasing governance of public systems at national level in parallel to increasing importance of supranational governance (Haas 1958).[7] The concept designates a process of supranational institution-building in European funding policy and its potential impact on the national, regional and local–institutional levels of research organization.

My analytical framework brings together two strands of theorizing, scrutinizing self-enforcing dynamics of research funding as one outcome of European integration in science. Conceptually, I specify the term so prominent in AS in three ways, inspired by Merton's social theory: Applying social mechanisms to macro-social processes; taking collective actors such as universities into account; and developing substantial analyses, indeed a middle-range theory, of social mechanisms in the field of research funding. Taking the ERC as a case study for reviewing these macro-social processes, I explain Europeanization of research funding as one of increasing social closure, oligarchization and reproduction of a small transnational scientific elite, to an extent that has not been the case before.

I develop a middle-range theory of Europeanization, paying special attention to the institutional structure of science in a cross-culturally comparative view, clarifying the variability of social mechanisms in diverse contexts of funding. Empirically, social mechanisms and consequences of ERC research funding are observable on the distinct levels of a) career trajectories and mobility behaviour of researchers, b) procedures of social choice and decision-making in groups of scientists, c) dynamics of social stratification among research institutions, d) centre–periphery–structures within and among public science systems at national level, and e) knowledge production and scientific growth in certain disciplinary fields of science. In Chapter 2, I formulate a set of assumptions to be scrutinized in the case study, referring to these different levels of analysis.

State of research and analytical framework

Chapter 3 provides a discussion of previous research in social science, and in the sociology of science in particular. In that respect, the last five decades have been characterized by a controversy[8] of structuralist versus constructivist approaches, reconceptualizing science and research either as a social institution led by a particular normative ethos or as a social 'laboratory' of scientists engaged in constructing facts in specific situations of social interaction. Providing a kind of synthesis of these two main approaches in the field, Pierre Bourdieu's critique of academic elites has analysed science as a field of power. These approaches to

theorizing 'science', including both the natural sciences and the social sciences and humanities, have also initiated empirical investigations of research funding and grant peer review.

In the structuralist tradition, the research questions sketched above have mostly been captioned by the dichotomy of universalism versus particularism in evaluating scientific knowledge by peer review. The respective work of Merton alluded to the normative universalist ethos of science, committed to meritocratic self-regulation by peer review procedures, and to the Matthew Effect theorem as a mechanism of allocating reputation and resources, contradicting meritocratic principles. In the last decades, Merton's theoretical reasoning has been empirically tested and partially confirmed in numerous inquiries[9] on peer review, both in the US and in single European countries. In parallel to an enforced transnationalization of research institutions since the 1980s, science studies began to focus on cross-national and cross-cultural comparisons that have systematically left 'methodological nationalism' of previous research behind and led to various kinds of institutionalist analyses of science.

Since the late 1990s, AS has emerged by continuing an institutionalist paradigm of social theory, drawing upon rational choice theory, frequently referring to central aspects of Merton's oeuvre as well (for instance, Hedström and Swedberg 1998). In favour of developing rather formal, abstract models, however, most recent AS has largely failed to realize a more empirically accentuated middle-range theory capable of specifying mechanisms typical for certain institutions of social life, such as science and research. Nevertheless, the concept of social mechanism may be useful in deepening our understanding of oligarchization dynamics in science, when applied to a macro-level of social analysis, scrutinizing transnational elite-formation by social closure and cumulative advantage processes. AS's knowledge claims can be specified, when substantially introduced in the sociology of science, by an empirical application to scientific institutions and processes. Then the aim is to reconstruct the general assumptions often implicit in sociological accounts and, on the other hand, to confront social theory concepts with methods of social research (Mozetic 2012: 137).

Methodology and research design

Chapter 5 introduces methods of empirical research used and combined in a comparative investigation of scientific careers. The research design combines both qualitative and quantitative strategies, namely secondary statistics, curriculum vitae (CV) analysis, bibliometrics, and in-depth interviews analysed by applying Grounded Theory methodology.[10] In the case study, I investigate structural transformations generated by the ERC by examining an extended sample of researchers from two cohorts, six disciplines, based at research institutions in 12 European countries. In a more fine-grained analysis, three disciplines (history, physics, sociology) and six countries (United Kingdom, Germany, France, the Netherlands, Sweden, Italy) of that sample were analysed in particular. In most cases, ERC data cover all years from 2007 to 2015. Quantitative inquiries such