On the essential role of organized skepticism in science’s “internal and lawful autonomy” (Eigengesetzlichkeit)

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Abstract
The institution of science is said to be under pressure from political, economic and social interests, manifested in alleged bureaucratization, managerial reforms, anti-intellectual movements on university campuses, and widespread questioning of expert knowledge in society. Commercialization of academic publishing and the growth of competitive funding have increased the importance of journal and grant peer review in science and seem also to have contributed to the proliferation of false impressions about the nature of scientific knowledge production and science’s role in society. In this article, these developments are problematized and put into perspective with the help of classic sociological theory in a Weberian and Mertonian tradition, in an attempt to shed new light on the debate on the governance and institutional autonomy of science. First, academic science is identified as a Weberian value sphere with “internal and lawful autonomy” (Eigengesetzlichkeit), and the broader functionalist context of this supposition is discussed. Second, Merton’s theory of the normative structure of science is used to give specific content to Eigengesetzlichkeit in the case of science. Third, the concept of organized skepticism is developed to represent a range of social patterns ubiquitous in scientific practice, and its epistemological and sociological foundations are discussed. Organized skepticism is thus identified as the essential feature of science’s Eigengesetzlichkeit.

Keywords
Institutions, Merton, organized skepticism, peer review, value spheres, Weber

Introduction
Academia is said to be under intense pressure from political and economic interests. Collegial self-governance is reportedly being pushed back by management models from
private enterprise, and by increased political and bureaucratic control, most conspicuously in the United States (Cole, 2015; Ginsberg, 2011; Kronman, 2019) and the United Kingdom (Williams, 2016), but also in Germany (Münch, 2014), Australia (Ryan et al., 2013), Canada (Woodhouse, 2019), and Sweden (Rider et al., 2013). The roots of this development have been traced to a belief that has been spreading among policymakers since the 1970s that the key role of universities in society is to drive economic growth, and that they are insufficiently productive in this capacity (Berman, 2014; Berman and Paradeise, 2016; Mirowski, 2011). Quantitative performance appraisals have enabled rankings of individual scientists, groups, departments, universities, and also their primary publication outlets – academic journals – with superficial but easy-to-grasp indicators such as impact factors, the h-index, and weighted measures of “excellence” (Hazelkorn, 2011; Macdonald, 2015; Münch, 2014). In recent years, such ideologically motivated agendas as equal treatment and anti-discrimination, and attempts to revise history in accordance with these agendas, are said to have been imposed on universities through political decree as well as bureaucratic concessions to social movements (Kronman, 2019; Lukianoff and Haidt, 2018; Williams, 2016). The status of science in society also seems ambiguous: calls for “evidence-based” policy and the prevailing canon that our society is, or should be, a “knowledge society” have boosted the cultural status of science and scientific knowledge and led to the “expertization” of politics and society at large (Góra et al., 2018; Pestre, 2003), although there are also growing concerns regarding knowledge resistance and the widespread rejection of expert knowledge (Boghossian, 2006; Klintman, 2019; Nichols, 2017).

All these developments appear to be putting (academic) science to the test and should be of critical relevance to the sociology of science, warranting sociological analyses of their origins, causes, dynamics, and consequences. To that end, this article relaunches and reinterprets some concepts from classical sociological theory of science and its role and function in society. The central ambition is to identify and conceptualize the distinctive features of (academic) science that separate it sociologically from other institutions or spheres of society, primarily the (bureaucratic) state and the (market) economy, which are claimed to exert the most pressure on science and thus allegedly corrupt its central value and norm systems. The article revives the Weberian notion that society is composed of a number of value spheres with “internal and lawful autonomy” (Eigengesetzlichkeit), of which modern science is one, and connects this idea to a broader functionalist theory tradition. Weber did not develop his idea of value spheres into a sociological theory, but noted that their respective Eigengesetzlichkeit create “irreconcilable tension” between them (Weber, 1915/2009: 351). In an effort to fill this general idea with analytical content, the article connects Eigengesetzlichkeit, and the tension between spheres, with Robert Merton’s theory of the normative structure of science, which formed the basis of the functionalist sociology of science and its understanding of science as a distinct institution in society, with distinct characteristics (Merton, 1938b/1973, 1942/1973). The article argues that science’s Eigengesetzlichkeit is multifaceted but that organized skepticism, one of Merton’s norms, stands out as perhaps its most important feature. The article concludes that a deeper understanding of science’s Eigengesetzlichkeit, with organized skepticism at the center, can be of help in
sociological analysis of the current tensions between the institution of science and other institutions in society, including politics and the economy.

The article begins with a brief historical account of the transformation of the role of science in society in the second half of the 20th century and beyond, including shifts in the governance of universities, summarized in the conceptualization of academic capitalism. This review is inevitably abridged and has a macrosociological rather than an economic or political focus. Thereafter, the article establishes the concept of organized skepticism and demonstrates how this can be used to denote a range of crucial social processes for the evaluation and validation of knowledge claims in science. Organized skepticism includes, but is certainly not limited to, formalized peer review processes for selecting manuscripts for publication in academic journals, and for selecting recipients of grants in competitive funding allocation schemes. The article argues that journal peer review and grant peer review, although crucial in today’s science system, are only a narrow subset of organized skepticism, which can and should be understood as something far broader and more profoundly important. The theoretical argument is laid out in the latter half of the article, and the concept of organized skepticism is developed sociologically and epistemologically, followed by a concluding discussion.

The article’s argument is partly normative. In the spirit of Merton (1942/1973) and Weber (1919b/2009), it urges a return to the core ideals of scientific practice that have, to some extent, been lost today. The article also aims to rectify the misconception that the functionalist sociology of science has become obsolete or irrelevant in today’s era of academic capitalism, by showing that these classics can be of use in both analytical work and normatively oriented debate. The article actively aligns with the Weberian and Mertonian traditions of ideal-typical reasoning (Weber, 1949b/2011: 89ff), and theorizing “of the middle range” (Merton, 1949/1968: 39ff), meaning that its aim is to conceptualize organized skepticism as an abstraction with analytical usefulness, in order to contribute to a better analytical understanding of a complex and contentious array of issues pertaining to the changing role of science in society. The aim is, however, not to develop an all-encompassing theory that would make other perspectives and other concepts redundant, but to make a limited and distinct contribution.

The changing role of science in society

Max Weber predicted that bureaucracy and the market economy would dominate society in the 20th century, and there is much to suggest that history has proven him right. The enormous social, economic, and technological developments of the past century can be understood as the accomplishment of a partnership of the (bureaucratic) state and the market economy, with scientific progress in a strongly supporting role. But many commentators have also shown how the increasing domination of the state and the economy in the 20th century dramatically transformed science as an institution. The mid-20th century saw unprecedented expansion in the volume of scientific activities sponsored and organized by both the public and private sectors, and undertaken with the help of economic growth and social and technological developments that made science a key factor for progress (e.g. Cozzens, 2003; Pestre, 2003). In the most recent decades, after the economic downturn that followed roughly 30 years of post-World War II growth,
science came under increased pressure to make palpable and measurable contributions to sustainable innovation-based economic growth, a pressure that led to what can be called the “economization” or “capitalization” of science, meaning that in the view of the public, its elected representatives, and the bureaucratic machinery at their disposal, the purpose of science (and higher education) is mainly, or only, to drive economic growth, or social development through economic growth (Berman, 2014; Berman and Paradeise, 2016; Kleinman and Vallas, 2001; Mirowski, 2011). Thus, while in the early to mid-20th century the greatest threats to the autonomy of academic science came from political totalitarianism, it has been argued that the most pressing concern today is economization or market fundamentalism, and its consequences (Kalleberg, 2007: 132).

Several analysts have shown how the growing demands on science to make efficient, measurable, and transparent contributions to innovation and economic growth have led to reforms in the governance of academic science inspired by management models from the private sector, including quantitative performance assessment as a basis for competitive resource distribution (Whitley and Gläser, 2007; Whitley et al., 2010), and the replacement of collegial self-governance with strategic management (Deem et al., 2007; Münch, 2014). These trends have a broader context of reform of public sector institutions and organizations, conceptualized as, among others, the Audit Society (Power, 1997) and New Public Management (NPM) (Hood, 1991). Others have shown how globalization and the structural transformation of economies have given rise to a globalized knowledge economy where scientific knowledge is no longer considered a public good but a private good that can be monetized or commodified (Berman, 2014; Mirowski, 2011). In the United States, the concept of academic capitalism has been used to describe a tendency of university professors to act like entrepreneurs or small business owners and run their research groups or labs with the help of an inflow and outflow of grants, human capital and prestige (Slaughter and Leslie, 1997). In Europe, the inner dynamic of universities is less entrepreneurial, and academic capitalism has instead been used to describe a structural transformation of the governance and funding of universities, and the emergence of a global market of students, funding, and prestige. Münch (2014: 3) calls it a “quasi market” since it lacks a price mechanism, and because the values created and disseminated in academic science and higher education are essentially non-monetary; scientific knowledge simply cannot be traded like a commodity. Therefore, analysts have claimed, “excellence” has become a kind of quasi-currency, and the hunt for such “excellence” has to some extent replaced traditional academic ideals of curiosity, creativity, and collaboration; and in so doing, it poses threats to proper academic practice (Rolfe, 2013; Watermeyer and Olssen, 2016). It has been argued that “excellence” is a hollow and thus meaningless term (Collini, 2012; Readings, 1996). According to this narrative, university leaders that pursue “excellence” in its contemporary meaning attempt to act like corporate managers, focusing their efforts on a strong performance in the competition for funding and higher ranking positions, and implementing financial management control and administrative routines to streamline the bureaucratic apparatus around the core activities of universities – education and research – which have, at best, to find ways to function properly in spite of these attempts at steering and the implementation of “excellence” standards (Ginsberg, 2011; Münch, 2014). Others have claimed that academic branding has grown into a business in its own right, increasingly detached
from actual academic practice and catering to universities’ monetary and superficial reputational ambitions rather than the quality of research and education in a deeper meaning (Alvesson and Kärreman, 2017; Bok, 2003).

In Europe, the term academic capitalism can thus be used to summarize the growing influence of practices and ideals from the (market) economy in universities, but this is only one aspect of the transformation of their governance. The early post-World War II arrangement for the state patronage of science in Western, liberal societies was built on the proven ability of science to make tangible contributions to technological, social, and (geo)political developments throughout the period of modernization, and in particular the two world wars, which gradually strengthened its cultural authority (Cohen, 1990; Merton, 1938a/1970), and a belief that extensive self-governance would allow science to remain productive, to the benefit of greater society (Elzinga, 1997; Guston, 2000). The postwar period of economic growth enabled generous funding for science but left the governance to scientists, and most funding therefore came with few or no strings attached, both in the public and private sectors. Reconsiderations of the aptness of this arrangement in the wake of the economic downturn of the 1970s led to downsizing and outsourcing in the private sector, and new evaluation practices, competitive funding schemes, and performance management to meet these goals, in universities (Elzinga, 1997; Ziman, 1994).

According to some, a side effect of this development has been the justification of ever-greater state intervention in universities, as if they were just any random branch of governmental bureaucracy or any open arena where social and political movements should be invited to shape discourse and influence agendas (Cole, 2015; Lackey, 2018). In the United States, social movements that call for a “group-based understanding of diversity” that promotes gender and ethnic equality at the expense of academic merit and distinction, seem to be spreading on university campuses (Kronman, 2019: 17–18) together with the suspension of academic freedoms for the sake of protecting students from ideas that challenge their perceptions of self and the world, and vulnerable minorities from exposure to any ideas or knowledge that can be interpreted as discriminatory (Lukianoff and Haidt, 2018: 13). At a kind of nexus of academic capitalism and this “coddling” of the minds of students, in the UK and elsewhere, it is claimed, fee-paying students are increasingly being treated as “consumers of higher education who must be satisfied, flattered and appeased rather than challenged” (Williams, 2016: 57).

Still, although several core values of science and higher education thus appear to be under threat and displaced by the promotion of other interests, the status of science and higher education seems to be rising in the eyes of the public. Analysts have pointed out that higher education remains widely regarded as the most crucial resource for individuals competing on labor markets (Alvesson and Kärreman, 2017), that science-based innovation, perhaps more than ever, is expected to be the main driver of economic growth (Lawton Smith, 2006), and that calls for “evidence-based” politics and decision-making are increasingly common in most policy areas (Cairney, 2016; Sanderson, 2009). The situation seems paradoxical: Although science as an institution is said to be under attack from political and economic interests, it nonetheless appears that trust in the authority of science and the wider societal benefit of the knowledge it produces is more solid than ever.
Peer review and organized skepticism

The quasi market created by the proliferation of academic capitalism in university governance and funding (Münch, 2014) seems to rely strongly on the availability of metrics that can be used as proxy for “excellence” and that allow the simple comparison and ranking of the performance of individuals, groups, departments and institutes, faculties, universities, subject fields, and even entire countries (Muller, 2018: 78ff). The most straightforward measure is grant funding, not only because it is an easy-to-grasp monetary measure but also because it is competitive and implies a zero sum game of winners and losers, which translates easily into rankings (Greenberg, 2007; Stephan, 2013). But however prestigious grant funding may be, it is a measure of input and not output, and there is much to suggest that by far the most important performance indicator used to demonstrate scientific “excellence” today is the number of articles published in what are regarded as “top” academic journals, of citations of these articles in other articles, and aggregated measures of these, such as impact factor and other citation indexes (Collini, 2012: 120ff; Weingart, 2005). The number of articles submitted to “top” journals is said to have exploded in recent years (Campbell and Meadows, 2011), and it is claimed that scientists nowadays are incentivized “to produce more publications, rather than better ones” (Muller, 2018: 79; cf. Weingart, 2005). What constitutes a “top” journal and a “better” publication used to be only a matter of internal evaluation, acknowledgment and acclaim in disciplinary communities, as extensively studied by Merton (1957/1973, 1960/1973, 1968/1973). But the commercialization of bibliometrics seems to have led to the proliferation of an oversimplified measure of excellence that builds on the idea of a near-absolute correlation between the quality of a scientific finding and the frequency of citations in the publication that communicates the finding (e.g. Macdonald, 2015: 266). While numbers of citations to an article likely, on average, correlates with the quality of the article and its findings, there are many reasons for citing articles besides appreciation of their quality, and the variation in practices of citation across the sciences makes any uniform measure problematic, to say the least (Muller, 2018: 79). But it is easy to understand the lure: The simplicity and straightforwardness of citation counts and aggregate measures make them readily accessible to non-expert policymakers and bureaucrats, and also, to some extent, to the broader general public, none of whom are equipped to grasp the results of, let alone undertake, the only viable method for assessing the deeper quality and relevance of scientific research, namely expert evaluation on a case-to-case basis (Hallonsten, 2021).

In this way, the journal article can be understood as a product, and perhaps as the answer to the tightening demand for demonstrably productive and “excellent” science, or as a commodity of the “knowledge economy.” Given that peer review is the conditio sine qua non of publishing in scientific journals, some have claimed that journal peer review has received a mythical status in the knowledge society; a consecration mechanism that loads scientific claims with the status of truthfulness and accuracy (Pacchioni, 2018: 82; Roberts and Shambrook, 2012: 34). This, too, is an absurd idea: In extreme cases, even pure hoaxes reach the pages of prestigious academic journals, while articles written and published in good faith may be wrong in their entirety or in specific respects. It is therefore a dangerous and erroneous supposition that journal peer review is the mechanism
that separates science from non-science and consecrates scientific claims or results as truth. To this we should add the many reports of chance, arbitrariness, incompetence, nepotism, ineffectiveness, conservativeness, abuse of power, and discrimination on the part of reviewers, editors, and also authors in journal peer review (for reviews of this literature, which is very broad and scattered across journals of a wide disciplinary spectrum, see e.g. Macdonald, 2015; Miller, 2006: 425–426). Similar flaws of bias and arbitrariness have been shown to characterize peer review in the competitive allocation of research grant funding (Laudel, 2006; Sandström and Hellsten, 2008; Wennerås and Wold, 1997) and it has even been suggested that grant peer review should be replaced by lotteries (Roumbanis, 2019).

Grant peer review has only been around for as long as there have been competitive grant allocation schemes, and journal peer review in its contemporary form became the standard procedure for the selection of manuscripts for publication in journals only during the latter half of the 20th century (Baldwin, 2018; Clark, 2015). In contrast, science has always relied on a wide range of varying structured and formalized procedures for evaluation and validation of knowledge claims, at all stages of the knowledge production process, from the formulation of initial ideas, through the design of experiments and studies, and the calibration and refinement of arguments and conclusions, to their publication and later incorporation in new work down the road. Scientific work involves a wide range of systematized procedures of experimentation, observation, calculation, analysis, selection, and so on, through which hypotheses are confirmed or refuted, and knowledge claims are made. The validity and relevance of these knowledge claims may, of course, be established by the replication of studies, and by the practical use of the knowledge, but far more profound and prevalent is the evaluation and confirmation/discard of the claims by peers. This takes many forms, but it is usually spontaneous, voluntary, and informal, based on trust and mutual benefit (Bourdieu, 1988; Whitley, 1984/2000). As a practice, it is passed on to new generations of scientists as part of their training and socialization into disciplinary communities (Hagstrom, 1965: 9–12). It includes (but is certainly not limited to) discussions on theory, method, results and research questions among scientists collaborating in a study or project; the grading of student essays and exams and the feedback given to the student by the teacher; the various forms of interaction between doctoral candidates and their academic advisors; the presentation of ideas and manuscripts by scholars to their critically and constructive colleagues at the academic seminar, and similar occasions where a predefined piece of literature is discussed; when younger scientists turn to older colleagues for advice on a project, manuscript, or idea, and also vice versa; when scientists reach out to colleagues for assistance and inspiration, over national and institutional borders, and interact with them at meetings and conferences; when published results are used as benchmarks in new studies and previously published works are cited and thus acknowledged for their quality and contribution, or criticized for their inadequacy; and when competing perspectives or schools engage in what the Germans call Prioritätsstreit, that is, priority disputes. Another example is Big Science, where task specialization and division of labor is extreme and the achievement of the individual scientist takes a back seat to overall goal-orientation and elaborate administrative structures (e.g. Galison and Hevly, 1992); while results and claims need to be validated in social processes, these may follow
patterns that are less academic in character, and, rather, reminiscent of the industrial or military organizations where such Big Science originated.

This varied collection of socially structured everyday procedures of evaluation and validation of ideas, claims, and results can be conceptually understood as organized skepticism. This concept is at the heart of Merton’s theory of the normative structure of science, and it can be used to fill the idea of science as an institution or value sphere with its own Eigengesetzlichkeit with content.

The Eigengesetzlichkeit of society’s value spheres

Max Weber launched his six “value spheres” (Wertsphäre) or “life orders” (Lebensordnungen), almost in passing, in his collected works on the sociology of religion (Weber, 1915/2009, 1920), and also used the value spheres in a discussion about the relationship between science and morality/ethics in one of his methodological essays (Weber, 1918, 1949a/2011). The value spheres and their Eigengesetzlichkeit did not amount to a comprehensive sociological theory, or a distinct contribution to such theory, but similar ideas and concepts are present in many of Weber’s other works (e.g. Weber, 1919a/2009, 1919b/2009, 1922/2019), which has led Swedberg and Agevall (2005/2016: 369) to suggest that the value spheres are “an integral part of [Weber’s] analysis of modernity,” and Münch (1988/2011: 208) to argue that they give Weber’s sociological effort a “unified meaning.” Weber’s six spheres are economy, polity, esthetics, erotics, intellectualism, and religion. Disagreement seems to prevail among Weber scholars as to whether he saw these six spheres as a finite set or merely an enumeration of those most important (Terpe, 2020: 23–24).

It is also rather unclear in Weber’s original writings what Eigengesetzlichkeit really consists of. According to Roth (1992: 457), the concept has meaning only insofar as it is made part of a social theory of modernity that includes separate value spheres that stand in (potential) conflict with each other, which, besides historical development, explains many of society’s inner tensions. Thus, while Weber notes in his essay on the meaning of ethical neutrality of social science that value spheres constantly “cross and interpenetrate” (Weber, 1949a/2011: 18), which has been interpreted as the acknowledgment that they forge relationships and can peacefully coexist, at least in liberal, democratic societies (Harrington, 2000: 96–100), it is also clear in Weber’s other writings that the Eigengesetzlichkeit of spheres fundamentally separates them from each other and makes them prone to inescapable mutual conflict (Oakes, 2003; Weber, 1915/2009: 328). The latter has been specifically acknowledged by Habermas (1984: 157ff) in his (re)interpretation of Weber’s theory of rationalization, where he argues that there is an immanent risk that value spheres dominate each other and thus create an “imbalanced rationalization,” which Habermas identifies in the 20th century expansion of bureaucracy and capitalist economy “at the expense of other domains of life” which they “squeeze into forms of economic or administrative rationality” (Habermas, 1984: 183).

While Weber is not normally considered a functionalist, his idea of value spheres with Eigengesetzlichkeit is consistent with much of the functionalist differentiation theory. Georg Simmel, Auguste Comte, and Herbert Spencer all viewed society as composed of units with specialized functions that contribute to the functioning of the whole, much like
the organs of the human body, and Émile Durkheim famously theorized the evolutionary
differentiation of politics, the economy, and the legal system from its religious origins as
an essential process in the modernization of society (Durkheim, 1893/1969). Functionalism
dominated sociology for the better part of the first half of the 20th century, with Talcott
Parsons and Robert Merton as its main figureheads. Parsons’ AGIL (adaptive
upgrading, goal attainment, integration, latent pattern maintenance) system of
functions for the survival and success of society, which corresponds to the economic,
political, fiduciary and community function systems (Parsons et al., 1953; Parsons and
Smelser, 1956/2010) forms the basis for an analysis of differentiated institutional realms
of society much like Weber’s value spheres, but as an advanced system and theory.
Merton’s empirically driven analyses of the “major institutions of society” (Merton,
1963/1976: 32) did not amount to a similar grand theorizing attempt, but nonetheless
significantly advanced the functionalist theory paradigm.

Throughout the 20th century, functionalists (and systems theorists, who similarly
theorize differentiation of society in autonomous spheres or function systems) identified
and studied various sets of value spheres or institutional realms, including politics, econ-
omy, science, family, art, religion, ethics, education, mass media, and sport, as well as
professions, social movements, and civil society as a whole (Alexander, 2006; Luhmann,
2012, 2013; Münch, 1987; Parsons and Bales, 1955; Parsons and Smelser, 1956/2010;
Stichweh, 1990; Zetterberg, 1962/2002). Reinterpretations of Parson’s legacy by critical
neofunctionalists in the 1980s showed that the analysis of the formation and evolution of
value spheres and their Eigengesetzlichkeit, in relation to other value spheres and society
as a whole, remains a promising line of inquiry in the tradition of Weber. These contribu-
tions quite clearly showed that the emphasis should not be on cataloging and exhaust-
tively describing a closed set of value spheres on the basis of their assumed function for
society as a whole, as Parsons proposed with his AGIL framework and others also have
suggested (e.g. Zetterberg, 1962/2002), but on studying contrasts between value spheres
by identifying and theorizing their distinguishing features (Alexander, 1985; Alexander
and Colomy, 1990; Münch, 1987, 1988/2011).

While the details of their theorizing and their preferred terminology differ, there is
nonetheless a profound Weberian consensus among the scholars mentioned, in that they
all acknowledge Eigengesetzlichkeit in some form and view it as key to the separation of
spheres, subsystems or major societal institutions from each other.3 Common to all func-
tionalists and sociological system theorists is also the identification of the (democratic
but bureaucratic) state, the (market) economy, and (academic) science as different
spheres that are organizationally differentiated and function in accordance with their
own norm systems, which make up their Eigengesetzlichkeit.

The differentiation of society into value spheres with Eigengesetzlichkeit is an essen-
tial part of the rationalization that created modernity, as Schluchter (1979/1992) has
shown in his (re)interpretation of Weber: first, religion is rationalized and the protestant
ethic becomes a driving force for the emergence of a capitalist economy, and then econ-
omy, bureaucracy and science are differentiated in their own processes of rationalization.
A similar analysis by Habermas (1984: 340ff) highlights first the differentiation of sci-
ence, art and morality/ethics from religion, and then a similar differentiation of economy,
polity, and the legal system. Yet another variation on this theme is Zetterberg’s (1991)
chronicle of the separation of the spheres of politics, public authority, and economy from traditional power and community structures such as religious divine authority, or family and clan, which continues with their tremendous success in creating and redistributing value and thus improving the material standards of larger and larger parts of humanity. These scholars appear to agree that the gradually increasing domination of the state and the (market) economy over society as a whole has created the spectacular success of the democratic welfare state, which has secured the well-being of other spheres such as religion, art and family through the regulation of their autonomy, but at the same time limited their influence. The theoretical framework allows the conceptualization of the wealth and unity of liberal democratic societies as created and upheld by pluralism and the maintenance of checks and balances between spheres of society, sometimes codified in legislation, and sometimes established by tradition and convention: free media keeps political corruption at bay, political regulation limits companies’ harmful exploitation of labor and natural resources, political power is executed through legislation, and so on. But famous allegations of contemporary “market fundamentalism” (Bourdieu, 1998; Polanyi, 1944/2001), the excess bureaucratization of society (Graeber, 2015; Habermas, 1984), and the withering of civil society (Putnam, 2000; Skocpol, 2003), have also prompted debate over the sacrifices that come with the building of a secular, rationally organized society that engages in a seemingly unceasing economic growth and extension of the services of welfare states. As suggested in a previous section, a more recent victim of the growing dominance of the state and the economy in society has been (academic) science.

Science’s Eigengesetzlichkeit and normative structure

The organizational separation of science and politics warranted by their respective Eigengesetzlichkeit was a topic of seemingly strong personal interest and devotion for Weber, expressed most clearly in the two lectures Politics as a Vocation and Science as a Vocation (Weber, 1919a/2009, 1919b/2009). Although Weber had the luxury of analyzing the Eigengesetzlichkeit of science in contrast to politics before the major social transformations of the 20th century had really started, his view was that if science and politics had too strong an influence over each other, both would be corrupted. This applies particularly to the bureaucratic machinery of the state, which Weber theorized in other major works and whose technical superiority and strong legitimacy he emphasized (see e.g. Weber, 1922/2019: 343ff). But he was also doubtful, even fearful, of the deeper impacts of the bureaucratization of society and its various parts (cf. Swedberg and Agevall, 2005/2016: 20–21), including science, for example when it becomes a tool in the hands of politicians or civil servants promoting a specific agenda or in some way acting self-righteously, and insensitive to core values such as academic freedom or the norm systems and organizational principles embedded in its Eigengesetzlichkeit.

Weber clearly puts science at the center of the rationalization that characterizes the modernization of society, and notes that the authority that science enjoys in current society should be understood as a product of culture rather than given by nature (Weber, 1949b/2011: 110). Merton came to similar conclusions in his early works (Merton, 1938a/1970), and devoted a large share of his collected sociological efforts to studies of the cultural aspects
of science’s role in modern society, that define science as an organized social activity and make it possible to examine its institutional conditions and how these have changed, by identifying shared practices and norms in science and using the knowledge to contrast science against other value spheres.

Merton viewed science as one of the most important institutions of modern, liberal societies, albeit simultaneously fragile and in need of safeguarding. Given the proven success of science and the prestige or cultural authority it had accumulated, Merton argued that a conflict between science and the essentially power-oriented political sphere is inevitable, unless society is built on liberal values that not only grant science the right to its own norm system but also neutralize the conflict by promoting and encouraging progress, creativity, and individual achievement, all central values in science that liberal society at large can identify with (Merton, 1938b/1973). Merton defines the “institutional goal of science,” in other words its role in modern society, as “the extension of certified knowledge” by “empirically confirmed and logically consistent statements of regularities” (Merton, 1942/1973: 270). From this institutional goal, he deduced the system of stable and predictable patterns for the behavior of the practitioners of science that has become known as the CUDOS norms: Communism (later renamed by some Communalism or Communality to avoid confusion), Universalism, Disinterestedness, and Organized Skepticism. Although never explicated by Merton, the acronym CUDOS is understood to allude to “kudos,” a Greek word for acclaim. Communism means that results are freely shared within the scientific community, and thus scientists suspend the pecuniary aspects of intellectual property rights in favor of acknowledgment of discovery and authorship. Universalism means that results and claims are received and evaluated in science completely independent of the nationality, gender, ethnicity, and so on, of the author. Disinterestedness means that scientists remain neutral to their studies and study objects. Lastly, organized skepticism means that ideas, results, and claims are critically examined through structured, predictable and/or mutually agreed procedures. Members of properly functioning scientific communities have moral bonds that make the norms binding both because they are “procedurally efficient” and because they are “believed right and good” (Merton, 1942/1973: 270). In the 1960s, followers of Merton developed the theory of norm compliance, arguing that scientists follow norms, and reproduce them, because it is in their interest to uphold a self-organizing system where the research they do out of personal devotion and interest is rewarded with recognition and, not least, is embedded in a social system that is conducive to productivity (Storer, 1966: 86), and that scientists are socialized into the norm system as a natural ingredient of academic education and doctoral training (Hagstrom, 1965: 9–12).

The CUDOS norm system has become at the same time famous and infamous, as it is accused of both rigidity and lack of correlation with reality (e.g. Mitroff, 1974; Stehr, 1978). Yet Merton always maintained a flexibility toward the norms, and made empirically grounded additions and revisions of them, for example adding “intellectual honesty,” “integrity,” “originality,” and “humility” and noting that the four CUDOS norms are a mere subset of the “complex set” of norms that characterize science (Merton, 1938b/1973: 259, 1957/1973: 303). He also discussed the occurrence of conflicting norms and counter-norms and analyzed the “sociological ambivalence” that these give rise to (Merton, 1963/1976). Some of his followers demonstrated how scientists
regularly violate the CUDOS norms, without thereby invalidating them (Hagstrom, 1965: 100; Storer, 1966: 165–166; Zuckerman, 1984). Consequently, critical claims that the theory of the normative system of science is intended as a complete guide for scientists on how to behave in each and every situation (e.g. Barnes and Dolby, 1970; Mulkay, 1976), are misplaced (Barnes, 2007; Bucchi, 2015). The theory should instead be viewed as a flexible conceptual description, in which some aspects are exaggerated, that can be used for approaching empirical descriptions of reality in order to enhance understanding, much like a Weberian ideal type. Given the significant intellectual kinship between Weber and Merton, and their shared conception of the role of theory in explaining and analyzing social life (Barnes, 2007; Portes, 2010; Turner, 2007), the fact that Merton intended his theory of the normative structure of science to be used as a “theory of the middle range” seems to echo Weber’s clear instruction that the value spheres with their Eigengesetzlichkeit should be viewed as an ideal type (Weber, 1915/2009: 323). This, in turn, means that it makes sense to use Merton’s work to explicate the Eigengesetzlichkeit of science, or, as Merton would have phrased it, to highlight the distinct features of science as an institution that separates it organizationally from other institutions, such as the (democratic and bureaucratic) state and the (market) economy. The Mertonian norm system can thus be adapted and developed, and selectively cultivated in a theorizing effort that brings it up to date with current debates on the alleged harmful pressure on (academic) science from politics and the economy, so that classic sociological theory can be of use in current sociological analysis.

The essential role of organized skepticism

A critical appraisal of the Mertonian norms yields that they are generally somewhat idealistic, and arguably not clearly tied to the actual process of scientific knowledge production, which makes them problematic and more prone to meet counter-norms and thus give rise to “sociological ambivalence” (Merton, 1963/1976), with the consequence that they cannot be followed without frequent exception. Disinterestedness, for example, runs counter to passion and devotion, which are arguably also commendable personality traits for scientists, and it would be naïve to believe or expect scientists to abandon their personal beliefs completely (cf. Weber, 1919b/2009: 147). Communism – the imperative to share knowledge freely and widely – certainly does not extend to every single finding (Kleinman and Vallas, 2001: 459), and probably should not; scientists must quite obviously retain some liberty to decide when and how to publish, and to strike a balance between making new knowledge available “as soon as possible” and avoiding “an undue tendency to rush into print” (Merton, 1963/1976: 33). In contrast, as shown in a previous section, the wide range of varyingly formal and structured processes whereby scientists evaluate and validate each other’s knowledge claims, seems fundamentally tied to the social structure of scientific knowledge production. The conceptualization of this collection of processes as organized skepticism can give new meaning to this Mertonian norm, and render it analytical usefulness in a Weberian and functionalist tradition.

Merton (1942/1973: 277) notes that organized skepticism “is both a methodological and an institutional mandate.” The latter means that it is a defining characteristic for science as an institution, and the former implies that it is at the heart of scientific conduct
and the organization of scientific work processes; in other words, a central resource in the fulfillment of the institutional goal of science, which is to extend certified knowledge. Certified knowledge is, however, not the same thing as truth in a final or absolute meaning. While many (or most) scientifically proven understandings about the world are solid enough to use as a basis for all kinds of acts of private and public decision-making, and most scientifically produced technologies are entirely safe to use both in everyday situations and in matters of life and death, they do not constitute anything other than a moving consensus among those scientists that are considered the most competent within a specific disciplinary field. The words moving and consensus are equally important here: It is by the forming of consensus, not the accomplishment of a proof in any absolute or objective meaning, that scientific knowledge is established, and this consensus is moving in the sense that it can, in principle, be changed at any time. It would quite clearly be inefficient and pointless to constantly question all established scientific knowledge, but it is a fundamental principle of science that anything can and may be questioned. A fact that is presently considered solid and secure can be refuted or revised on basis of new insight, at any point in time (cf. Fleck, 1935/1979: 20; Popper, 1956/1988: 46), a necessary “liberal” principle of science that analysts have argued is absolutely crucial to defend against fundamentalism and dogma, including not least those of political or ideological origin (Rauch, 1993/2013: 4ff).

Philosophically speaking, organized skepticism is the mechanism that strengthens and solidifies scientific knowledge claims through a process that entails both amendment on the basis of critique from peers, and validation through approval by peers. Popper (1959/2002) famously conceptualized this as falsification attempts, by which he meant that scientists (should) constantly seek to disprove the claims of each other (and themselves). This provides an epistemological foundation for organized skepticism that must be understood ideal-typically, as an abstraction used to better understand it. According to Popper, scientific knowledge claims become provisionally corroborated if they withstand falsification attempts (Popper, 1959/2002: 264, 275), which means that organized skepticism is the process of exposing scientific knowledge claims to absolutely crucial challenges, without which they would remain weak, incomplete, and in many or most cases probably also both irrelevant and unknown. It is therefore not falsification as such that is important here, but the acts of putting knowledge claims to tests, the results of such acts, and the systemic role this has for science as an institution. This also enables the thought-provoking interpretation of scientific knowledge claims as antifragile, meaning that they gain strength from attacks, much like the immune system, but grow increasingly weak if they are unchallenged (Taleb, 2012).

The sociological foundation of organized skepticism as key to science’s Eigengesetzlichkeit can be explicated by pointing at the fact that science’s institutional goal is to extend certified knowledge. This means that the imagined lone genius, working in isolation from peers and following the scientific method, will continue to take “leaps in the dark” (Waller, 2004) without ever having his or her way lit by the input of peers. Science’s increased disciplinary complexity and fragmentation in the past century, driven by growth, specialization and technological sophistication (e.g. Ziman, 1994), makes replicability of experiments and observations, as a means of validation of knowledge claims, sociologically problematic. The notion that the scientific method is anything like
a cooking recipe that enables anyone to replicate any experiment or study on the basis of the methods section of the publication where the results emerge, is at best oversimplified (Polanyi, 1966/2009). If it is in any way an accurate description of how scientific knowledge is produced, it is undoubtedly confined to very specific, quantitatively oriented, disciplinary fields. Much more universal is the qualitative appraisal of method, theory, plausibility, argumentation, support in previous works, and so on, by peers. This is in all probability the most common way of evaluation and validation of scientific knowledge claims, and it is reasonable to expect that most of this appraisal happens informally and verbally, in all those various instances where scientists confide in colleagues and discuss with peers ahead of a study’s commencement, or during its course, or when results are to be published, and in the ex post appraisal of the usefulness of results when other peers down the line read and engage in debate over published findings and decide whom to cite and include in their lists of references. In this way, consensus concerning the accuracy of the findings in question is slowly established and maintained.

The key role of organized skepticism in the forming of consensus extends to the aggregated formation of a state of the art in scientific fields and subfields, against which validity, relevance, and originality of new knowledge claims are evaluated (Polanyi, 1966/2009: 70ff). This includes standardizations of language and expression within disciplinary communities; for example, the use of mathematical formulas in physics, the use of Latin words in botany and medicine, the association of the concept of “bureaucracy” with rationality and modernity in the social sciences, and so on. Kuhn argued that such standardization is just as crucial in science as is innovation (Kuhn, 1959/1977), but the “essential tension” between conventionality and novelty is not between two static poles: Each time a scientific study, experiment, or observation is made, it routinely and unavoidably makes use of previous knowledge that was scientifically produced, and thus participates in the validation of that knowledge. In Popperian terms, this can be understood as an unintentional act of attempted falsification. Existing knowledge, including technologies generated on its basis, constantly undergoes refinement and adjustment through its use in further scientific work. This is one variety of organized skepticism that complements all the other socially structured processes of evaluation and validation of knowledge claims.

Key to the conceptualization of organized skepticism as central to science’s Eigengesetzlichkeit is, therefore, that it constitutes the social aspect of scientific knowledge production, and as such is universal and instrumental to all sciences. Differently put, organized skepticism is typically not involved in the generation of new ideas (although these can certainly arise in social settings) but is crucial for singling out good ideas and knowledge claims from bad ones. This does not make organized skepticism into a foolproof mechanism for determining the value of a scientific finding or knowledge claim, since such value can vary over time and is assigned and reassigned in endless and dynamic processes that involve actors and institutions both within and outside of science. But organized skepticism is a key principle of scientific self-organizing, and thus sociologically relevant and possible to conceptualize as the essential feature of the Eigengesetzlichkeit of science as an institution or value sphere. The value of a scientific knowledge claim can only be established through mutual control between the knowledgeable, which produces consensus. In this process, which is widely varied and continuous, contributions deemed
irrelevant or false are neglected, discarded, or overthrown, and those which make a profound contribution become validated and incorporated into the scientific commons, and in some cases renowned and widespread. The process goes on. Scientists comply with the norm of organized skepticism because it has a directly contributory role in the research process: Organized skepticism enables any scientist to tap into the wisdom, experience, and competence of peers, thus using it to promote their own idea or project. This is why organized skepticism is universally accepted, and essential to science’s Eigengesetzlichkeit.

Conclusions
This article bases its argument on the assumption that science can be understood as a Weberian value sphere with Eigengesetzlichkeit, distinctly different from that of other value spheres, most evidently the (bureaucratic and democratic) state and the (market) economy. From this point of view, and armed with the conceptual apparatus of functionalist differentiation theory and functionalist sociology of science, it is possible to contribute analytically to the current debate on the allegedly excessive influence of state and economy over (academic) science. Some influential contributors to the sociology of science in the past half-century have, rather impressively, argued and demonstrated that scientific practices, including the attachment of the status of “truth” to scientific results and claims, are mere power games and thus, in principle, indistinguishable from politics and other exercises of authority (Knorr Cetina and Mulkay, 1983; Latour, 1988). The different yet complementary view expressed in this article is that politics and science are essentially different, and that this is a perspective that would be useful in the current debate on the allegedly destructive influence of (state) bureaucracy over science. In a similar vein, although attempts to economize science through governance reforms are said to have gone far and deeply transformed academic practice, it is still the case that scientific knowledge, and the rewards bestowed on those producing such knowledge, cannot be readily quantified and commodified, because the socially structured processes for knowledge production and allocation of credit in science are, and must be, distinctly different from those of the capitalist economy. It could be argued that this perspective is also valid and should be maintained in the continued debate on the “economization” of science and the harmful effects of academic capitalism.

Weber (1915/2009: 351) argued that value spheres stand in “irreconcilable tension” with each other, and Habermas (1984: 183) added that their “imbalanced rationalization” creates a risk that the bureaucratic state and the market economy will come to dominate other spheres. This article began by reviewing the claims that (academic) science is under threat from bureaucratization and market fundamentalism. It is implicit to the theoretical framework of science’s Eigengesetzlichkeit that science be left to govern itself with minimal practical interference by or directives from either the state or market forces, because this is necessary in order for it to fulfill its institutional goals, namely the extension of certified knowledge. This, in turn, means that science’s Eigengesetzlichkeit cannot be replaced by, exogenous control by, say, regulations and incentives established by parliaments, executives or bureaucrats, or by governance and evaluation standards from the economy. Critics and prominent representatives of other value spheres will argue that such exogenous regulations and incentives structures, in particular the governance and
oversight of state authorities over universities, are necessary, to keep science within the bounds of what is morally acceptable and to detect and correct mistakes, fraud and pseudoscience. Although science is part of society and, therefore, obviously subject to its legislation and ethical standards, it can be argued that organized skepticism, if properly implemented and maintained, can correct such deviations before they reach a serious level. This implies that the role of national legislation and bureaucratic oversight concerning (academic) science, which certainly cannot be abolished altogether, should be to enable the maintenance of science’s Eigengesetzlichkeit and, in extreme cases, also actively defend it from various forms of unscientific behavior, instead of – as, unfortunately, seems to be the situation today – imposing regulations and incentives on science that corrupt it and impede its abilities to self-govern.

The forwarding of this normative argument, as well as its practical implementation as policy, quite obviously necessitates a deeper knowledge about the Eigengesetzlichkeit of science. The analytical contribution of this article is the conclusion that science requires institutionalized processes for mutual control of knowledge claims in order to fulfill its institutional goal of extending certified knowledge. Scientific knowledge production has many components, among them individual creativity, devotion and effort, and methodical investigation, experimentation, observation, interpretation, selection, and replication. But the only way for individual scientists to escape the ignorance regarding the nature, meaning, and significance of their knowledge claims is to put them up for scrutiny by peers. Therefore, the concept of organized skepticism, as an ideal type, is to be understood as the core of the Eigengesetzlichkeit of the value sphere of science, and it is to be understood as both an institutional and methodological mandate.

Finally, a topic of further investigation should be to study the extent to which journal and grant peer review have become overly significant in current science at the expense of other forms of organized skepticism. Conceptually, it is of course reasonable to ask if this is not in fact reasonable and appropriate. Perhaps journal and grant peer review can be conceptualized as Weberian bureaucratic versions of organized skepticism – clear, transparent, standardized and efficient procedures for the allocation of funding and the validation of knowledge claims for publication, devised to prevent nepotism, arbitrariness, and other forms of unfair treatment. The risk is, however, the same as with any bureaucracy, namely that it leads to conformism at the expense of creativity and imagination, and quantitative “box-ticking” evaluations instead of deeper appreciation for quality (Alvesson and Gabriel, 2013: 246). It is also possible, conceptually, to discard journal and grant peer review as mere tools in the hands of those intent on making infringements on science’s Eigengesetzlichkeit through academic capitalism, since it renders legitimacy to quantitative performance assessment and the management of academic organizations as quasi-enterprises on quasi-markets.

A return to the rule of wider and more varied organized skepticism is, arguably, the only way to restore scientific autonomy and reinstate science’s Eigengesetzlichkeit, which – as history has proven – is crucial if it is to function as one of society’s most critically important value spheres and for the efficient fulfillment of its institutional goal of extending certified knowledge.
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Notes
1. Eigengesetzlichkeit is the original term used by Weber in his “intermediary reflection” (Zwischenbetrachtung) between sections 2 and 3 in his collected essays on the sociology of religion (Gesammelte Aufsätze zur Religionssoziologie) that first appeared in print in 1904-05 and was published in a final revised version shortly before his death in 1920 (Weber, 1920: 554). The term was most famously translated as “internal and lawful autonomy” by Gerth and Mills (Weber, 1915/2009: 328), but Roth (1992: 457) has suggested the much simpler “autonomy,” which suggests that it is difficult to do full justice to the original term in English. For this reason, Eigengesetzlichkeit will be used here and treated as an original concept.

2. Peer review is not necessarily only a label for these formalized processes, but can be used to describe the entire range of formal and informal activities where organized skepticism is practiced, that is, where peers review each other’s knowledge claims. For the sake of simplicity, however, organized skepticism is henceforth used to denote this whole breadth of activities, and journal and grant peer review is used to denote the formalized appraisal processes practiced by academic journals ahead of publication of manuscripts, and by funding bodies ahead of grant allocation.

3. In order to underscore the unifying role of Weber in this branch of functionalist differentiation theory, the terms value spheres (or simply spheres), and Eigengesetzlichkeit (see note 1), will henceforth be used.

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