



A “Dinosaur Doomed to Extinction”?

The Polish Academy of Sciences in the Post-Socialist Era

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This article examines the recent history of the Polish Academy of Sciences (PAS) and its puzzling institutional stability despite sweeping societal transformations in its political and economic environments in the post-socialist era. The article shows that PAS has undergone mainly gradual changes that have not yet been transformative. Most important, it is argued that new formal rules addressing institutional change at PAS could not be properly implemented and have had little behavioral effect because the resources necessary for their implementation were not provided. The article illustrates how a shortage of research funding and a decline in scientific staff in the 1990s and 2000s helped sustain the status quo at PAS.

INTRODUCTION

This article examines the recent history of the Polish Academy of Sciences (PAS). This research organization currently consists of 70 research institutes, which received 1.7 billion PLN (453.5 million US\$) in funding and employed 5,350 researchers in 2015. The PAS is an important knowledge producer within the Polish science system: 14 percent of all Polish publications originated at PAS; 18 percent of all science funding went to PAS, and 11 percent of Polish scientists are employed here (data in 2015).¹ Not only is the PAS a cornerstone institution of science in Poland; it is also a particularly interesting case because it seems to have undergone relatively little institutional change despite sweeping societal transformations in its political and economic environments since the end of the Cold War. Compared to the Polish higher education sector, which has undergone considerable growth in research entities, funding, and staff, PAS institutes have suffered considerable reductions in staff and steep budget cuts during the 1990s and early 2000s.² Some commentators have called the PAS a “dinosaur” that is ultimately “doomed to extinction.”³

The institutional stability of PAS is all the more interesting because it seems that other academies of sciences in former East bloc countries have likewise managed to continue their operations well into the twenty-first century. The academies in the

Baltic states were abolished almost entirely, or at least stripped of their policymaking and research functions, but they are an exception. The academies in Bulgaria and Hungary have maintained their role as a dominant player within post-socialist science systems.⁴ In the Czech Republic, the academy has been fully restored and even operates its own project-funding agency.⁵ As the most recent history of PAS appears to be similar to other former socialist academies of sciences, its analysis could yield insights that are relevant also for them.

Therefore, this paper addresses the puzzle of how to explain the institutional stability of PAS. Despite the overall impression that the PAS is a dinosaur, the paper shows that there has been change inside this organization, although mostly gradual and not yet transformative. These gradual changes can be explained with reference to *layering* and *displacement*, two important processes that have been theorized in the tradition of *historical institutionalism*.⁶ Through our analysis, we found both layering and displacement within the PAS. Furthermore, we found that both processes depend on the availability of sufficient resources.

Layering means that new formal rules are added to the existing ones, thus enabling change without directly challenging the powerful actors interested in keeping the institutional status quo. In contrast, displacement means that new rules directly replace existing ones, signaling that proponents of the status quo are less powerful.⁷ Both processes are plausible in a post-socialist context, where old scientific elites try to protect the socialist legacy, but new policies and rules are introduced by new elites with little allegiance to the past. Layering and displacement are driven by

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various institutional mechanisms, as explained in the discussion of theory below.

It is important to point out that this paper does not simply apply these two theoretical categories to a new case, but extends the explanatory power of historical institutionalism in one very important aspect that has received little attention so far: the connection between the implementation of new rules and appropriate resources. Using the PAS as a historical example, the paper illustrates that new formal rules cannot be properly implemented and will have little behavioral effect if the resources necessary for their implementation are not provided. Hence, layering of new rules might turn out to be ineffective.

In addition, even if old rules have been replaced by new ones, the behavioral patterns associated with the old rules may be activated under resource constraints, and thus erect barriers to effective behavioral changes intended by the new formal rules. Thus, in a situation of resource scarcity, displacement of old by new rules might unintentionally have the opposite effect: preservation of the institutional status quo. The paper illustrates how a shortage of research funding and a decline in scientific staff created situations in the 1990s and 2000s that sustained the status quo at PAS for quite some time.

The article proceeds as follows. A review of theoretical considerations is followed by a brief introduction of the data used in this analysis. We then present a short history of PAS and proceed to the analysis. The paper closes with a summary of findings and discusses research desiderata.

HISTORICAL INSTITUTIONALISM AND THE CONCEPT OF GRADUAL INSTITUTIONAL CHANGE

Research on institutions and institutional change has grown considerably in recent years.⁸ One fruitful line of research is *historical institutionalism*, which emphasizes formal rules and regulations.⁹ While much of the earlier research on institutions focused on either stability or disruptive change,¹⁰ studies in the tradition of historical institutionalism make efforts to overcome the simplified distinction between institutional stability on the one hand (path dependence) and abrupt institutional transformations on the other hand (revolutions).

One key idea of historical institutionalism is *gradual change*: institutions are understood as constantly changing because formal rules need to be enacted in the context of social, political, and economic conditions.¹¹ Yet, establishing new rules is one thing, implementing them is another thing. Accordingly, changing formal rules does not automatically result in changes in behavioral patterns. Rather, aligning actual behavior with new formal rules takes time, and the alignment itself can be the source of new gradual changes in the formal rules themselves.¹² Thus, gaps “between the intended ‘design’ of an institution and its on-the-ground implementation and effects” are quite typical of gradual processes of transformation.¹³

Another key idea in historical institutionalism is that endogenous gradual change occurs through *processes and mechanisms*. One such process is *layering*, which means that new rules are attached to existing ones. Layering takes place when old elites are powerful enough to hinder institutional challengers to the existing rules. In this situation, new rules are added on top of or alongside old ones.¹⁴ Another process is *displacement*, where existing rules are directly replaced by new rules and associated behavioral patterns. Displacement takes place when old elites are relatively weak, and thus cannot hinder the challengers’ efforts to impose new formal rules in place of the old ones.¹⁵

The social mechanism that prompts and sustains layering as a gradual process of institutional change is *differential growth*: actors follow the new rules more than the old rules, and thus the old rules are crowded out and their institutional domain progressively shrinks.¹⁶ In comparison, displacement occurs via two social mechanisms: either the existing rules are substituted by previously suppressed or suspended possibilities (*reactivation*), or they are overwritten by rules developed outside the focal institutional domain (*importation*).¹⁷

The three mechanisms are plausible in a post-socialist context, where formal institutions from socialism are protected by old elites and stand in conflict with new policies (layering); where institutional practices from the pre-socialist era can be reinstated, even after long times (reactivation); and where rules developed in democratic Western countries are used as blueprints for replacing state-socialist practices (importation).¹⁸

Both the idea of gradual change, and the idea that such change occurs through processes that are, in turn, prompted and sustained by social mechanisms, helps us conceptualize the way in which existing formal rules are exchanged step-by-step for new ones. Whether layering or displacement occurs has to do with the power relations between the old and the new elites. In the case of strong old elites, and thus veto power, layering is more likely to occur, whereas in the case of weak old elites, and thus little veto power, displacement is more likely.¹⁹

Another factor behind the occurrence and the impact of both processes is the availability of sufficient resources. Layering of new rules might turn out to be ineffective if the resources necessary for their implementation are not provided. Displacement of old rules by new rules might unintentionally have the opposite effect, since behavioral patterns associated with the old rules may be activated under resource constraints. In both instances, the unavailability of sufficient resources is likely to interfere with the alignment of formal rules and intended behavior. As was mentioned above, endogenous institutional change occurs through the non-alignment (or “gaps”) between formal rules and actual behavior. Commonly, the *historical institutionalism* literature attributes these gaps mainly to cognitive or informational limitations, political compromises and ambiguities, and reinterpretations of rules that are far from the original intent of their designers.²⁰ One important

dimension, however, is missing: the extent to which the new elites can mobilize resources necessary for the implementation and the enforcement of new rules. It is a plausible assumption that if enough resources, such as funding and staff, are provided, actors on the ground will follow the new rules more swiftly compared to a situation where new rules are introduced on paper only. In other words, the introduction of new rules and their implementation depends on the resources made available in support of the new rules.

As will be shown in the analysis below, the shortage of resources is key to understanding the long period of institutional stability in the case of PAS: a severe decline in funding for PAS institutes in the 1990s practically rendered new funding rules ineffective and later helped to reactivate behavioral patterns from the socialist past. The situation changed when the funding situation improved in the 2000s.

A SOCIOLOGICAL CASE STUDY OF THE POLISH ACADEMY OF SCIENCES

This paper draws on a comprehensive data set that comprises four data sources. First, formal rules concerning the PAS were systematically studied based on laws and regulations, including the 1960 PAS act, the 1970 PAS statute, the 1997 PAS act, and the 2010 PAS act.²¹ Second, factual information concerning PAS was excerpted from its annual reports, in-house publications, chronicles, statistical reports, and governmental documents.²² These sources were partly retrieved from the Polish National Library in Warsaw and from the Herzogin Anna Amalia Bibliothek in Weimar. Third, data on funding and staff at PAS were collected and analyzed.²³ The quantitative data were collected from the annual reports of the PAS (*Sprawozdanie PAN*) and the Statistical Yearbook of the Central Statistical Office (*Rocznik Statystyczny, GUS*), which are available at the National Library in Warsaw and the Central Statistical Office of Poland (Główny Urząd Statystyczny). In addition, five interviews were conducted with representatives from the PAS central administration and from three PAS institutes in the fall of 2014.

The analysis of these various documents was guided by an analytical framework based on the theoretical approach sketched out above. First, we identified three significant time periods. The first period captures the characteristics of the PAS during socialist rule (status quo 1989). The second period covers the time in which conflicting formal regulations regarding the PAS were in place (1990–1997). The third period covers the time when the first dedicated PAS act amended the former socialist legacy, and an additional PAS act was enacted (1998–2014).

Second, the empirical material is organized around three functions of the PAS: the *policymaker function*, which includes the competence to provide basic research funding; the *umbrella organization function*, which includes the capability to establish new research institutes; and the *learned society*

function, which includes voting rights in the academy. We then trace each of the functions through time. This enables us to identify processes of gradual institutional change, each of which will be elaborated, including the three mechanisms at work. Figure 1 summarizes the paper's findings and aims at providing an overview of the analysis below.

THE POLISH ACADEMY OF SCIENCES UNDER SOCIALIST RULE, 1952–1989

The PAS was founded in 1952, and it had basically three functions: it was a *learned society* of scientists; it was a *policymaker* for basic research in Poland; and it was an *umbrella organization* for more than 70 research institutes. Although the first function was that of a traditional academy, reaching back to its nineteenth-century predecessors, the latter two functions originated from the Soviet model of science.²⁴ That model was widely adopted throughout Central and Eastern Europe (CEE) after World War II.

Originally, Poland had two academic societies: one was established in Warsaw (Towarzystwo Przyjaciół Nauk, TPN; the Warsaw Society of Friends of Learning) and one was established in Krakow (Polska Akademia Umiejętności, PAU; the Polish Academy of Learning).²⁵ After World War I, the Krakow society was renamed the Polish Academy of Arts and Sciences, and it became the official society for representing Polish scientists.²⁶ With the German occupation of Poland between 1939 and 1945, the Academy was officially dissolved and forced to move underground or abroad. After the liberation of Krakow in January 1945, the Academy began reconstruction.²⁷ Then, in 1951, state authorities took over the assets and functions of the Academy, and it was merged with the Warsaw-based counterpart to create the Polish Academy of Sciences (PAS).²⁸

The creation of the new PAS arose from an ideological premise that all of its satellite countries should adopt the Soviet Union's model for the organization of science.²⁹ Accordingly, in addition to being a society of scientists and scholars (*learned society*), the socialist PAS became a *policymaker*, and thus an agency responsible for coordinating scientific efforts, planning, and distributing funds for basic research. Furthermore, it became the *umbrella organization* under which all research institutes were assembled.

Its role as a *learned society* meant that it gathered both full and corresponding domestic members, as well as foreign members, who were proposed and elected by the General Assembly. The number of members did not exceed 350.³⁰ In 1952, the president of the People's Republic appointed the first 148 members. The numbers grew to 200 in 1962 and to 300 in 1973.³¹ According to the PAS laws of 1951 and 1960 respectively, all members were expected to provide research in accordance with the work plan of the Academy, prepare an annual report on their work, and take part in the General Assembly to elect the president of the PAS and four vice-presidents.³² The election results had to be approved by the Council of Ministers, which

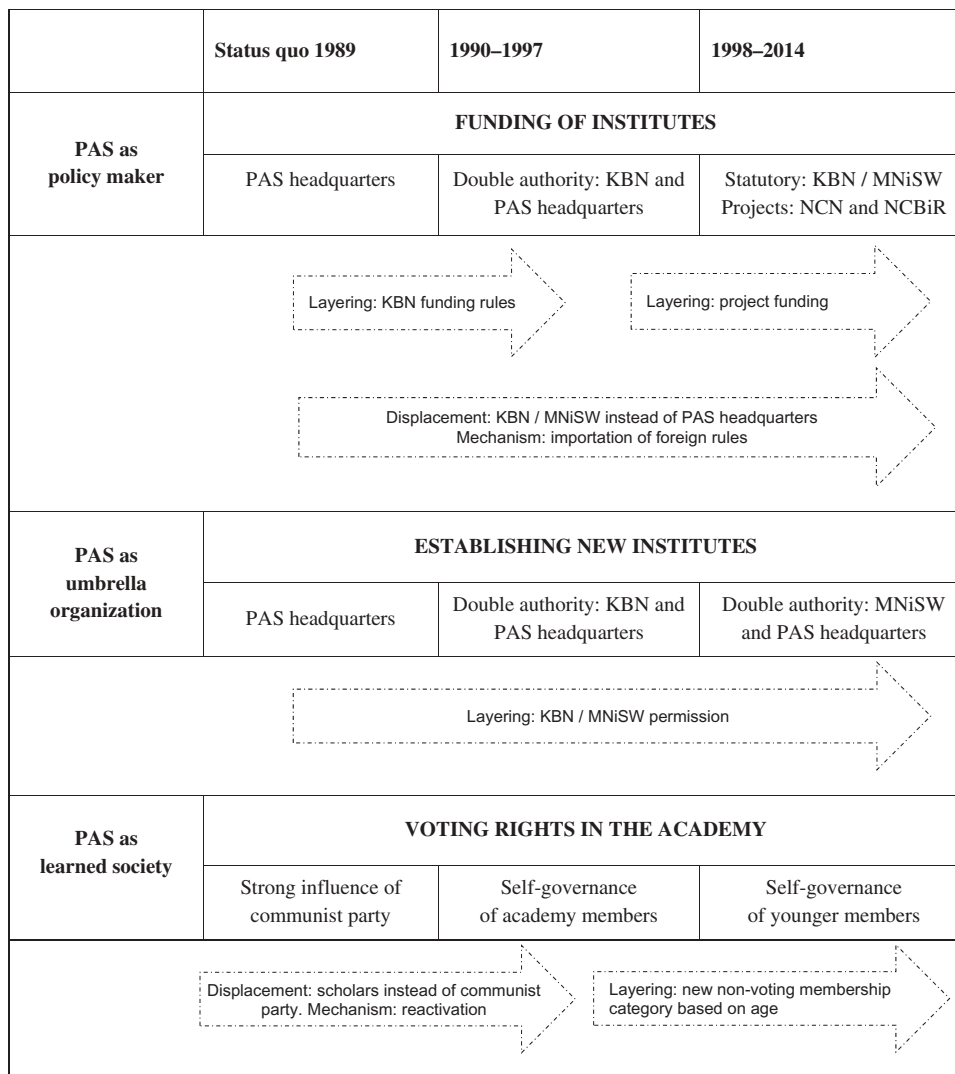


FIGURE 1 Overview of the processes of institutional change that occurred within the PAS, as analyzed in this study. PAS: Polish Academy of Sciences; KBN: Committee for Scientific Research; NCN: National Center for Science; NCBiR: National Center for Research and Development; MNiSW: Ministry of Science and Higher Education. (Diagram created by the authors.)

also proposed the secretary general, the secretaries of the sections, and their deputy secretaries.³³

The secretary general designed the five-year plans for research, which listed the country's key scientific problems and the research directions to resolve these problems.³⁴ The plan's content was elaborated by the scientific committees in cooperation with the respective ministries.³⁵ Through the five-year plan, the PAS acted as a *policymaker*, "coordinating the research activity of all scientific establishments in the country."³⁶ The policymaker function made the PAS the "central state organ in the area of planning and coordinating of scientific research."³⁷ Because the PAS was a corporation of scientists, it gave the impression of a self-governing scientific community. In fact, however, the power endowed on the secretary general and the influence of the Council of Ministers established a clear hierarchy. Thus, "the organizational hierarchy of the socialist

party was replicated within the academy, and the higher-level party secretary became a member of the academy's leadership."³⁸

Furthermore, the PAS acted as an *umbrella organization*. All institutes were founded within and were subordinate to the divisions. Institute funds were distributed by the secretary of the division, and their work was guided by the research plans. PAS institutes had partly existed before 1952 and were built around two or more professors considered experts in their fields. By the end of the 1960s, the PAS had gained a "monopoly in several fields in basic research, placing serious limits on research opportunities for teachers at universities and colleges."³⁹ In 1970, the 1960 PAS law was amended in that the task of directly managing the institutes was handed over to the secretary general, who held the "powers of a minister regarding the organizational, administrative, financial, and economic issues."⁴⁰

INSTITUTIONAL CHANGE AT THE POLISH ACADEMY OF SCIENCES AFTER 1989

Between 1989 and 1991, almost all legal regulations concerning Polish science and research were abolished and replaced by new ones. Most notably, the 1990 Act on Higher Education and Scientific Titles and Degrees granted free access to the institutions of higher education, which were to be organized on the principles of freedom, democracy, and both administrative and scientific autonomy; it also permitted the establishment of private providers of higher education. Yet, there was one conspicuous exception: the 1960 PAS act and the 1970 PAS statute were left untouched. Using insights from the historical institutionalism literature, this clearly suggests powerful veto players: in this case, the established socialist scientific elite at PAS. When agents of change (such as the post-1989 Polish government) face political contexts with strong veto players, the removal of old rules is unlikely. Rather, new rules are introduced, since, although “powerful veto players can protect the old institutions, they cannot necessarily prevent the addition of new elements.”⁴¹ How this mixture of new rules and inherited socialist rules affected the PAS in its functions as a *policymaker*, an *umbrella organization*, and a *learned society*, respectively, will be investigated in the following sections.

Funding of PAS Institutes

Faced with a powerful socialist elite at PAS, the new political elite could not directly replace the formal regulations governing the PAS with new ones.⁴² However, it could establish new rules regarding the funding of public science and higher education in Poland more generally. With the 1990 act, the State Committee for Scientific Research (Komitet Badań Naukowych, KBN) was created, and thus a new agency that was responsible for coordinating the funding for all public research organizations, including the PAS institutes. KBN established new funding rules that required ex-post, peer-reviewed evaluations, as well as proposal-based project funding that was distributed to PAS institutes in addition to the already existing statutory funding.

With the KBN reform, PAS institutes were placed under the double authority of PAS and KBN.⁴³ This situation meant that statutory funding was provided by the KBN on the basis of an ex-post evaluation, and PAS institutes started to seek additional grant monies from both KBN and external funders. At the same time, PAS institutes did not have any legal status, and thus seeking external grant monies without involving the PAS headquarters brought them into “sharp conflict with the Academy’s statutes.”⁴⁴ This meant that for seven years after the collapse of state socialism, inherited socialist rules co-existed with newly introduced “Western” rules.

Yet, an open conflict over these legal inconsistencies did not break out. The absence of open conflict might be explained by the dramatic decline in available resources that took place in all three sectors of the Polish public science system.⁴⁵ In 1996, PAS institutes received merely 60 percent of the funding

allocated in 1991 (inflation-adjusted).⁴⁶ This stood in contrast to the high rankings of many PAS institutes based on KBN’s research evaluations.⁴⁷ As a consequence, the new KBN funding rules were largely ineffective and enjoyed little legitimacy among PAS institutes. The double authority was also criticized by the Supreme Audit Office of Poland, which argued that it hindered the ability of the PAS to fully mobilize its scientific potential.⁴⁸

Then, in the late 1990s, the double authority gave way to a more consistent funding arrangement: the 1997 PAS act clarified KBN’s role as funder of PAS institutes, and abolished the PAS headquarters as funding agency. However, the financial situation did not improve. When PAS institutes received lower ratings from the KBN in 2001, they faced another substantial cut in their statutory budget.⁴⁹ In that situation, the PAS president, without any formal authority as policymaker, intervened and convinced the KBN to abstain from making these cuts.⁵⁰ Although financing the statutory activities of the PAS institutes had become the responsibility of the KBN in 1997, the PAS president reactivated a socialist behavioral pattern (*policymaker*) and thus saved “his” institutes. Clearly, this situation stood in conflict with the 1997 PAS act, but it was perceived as legitimate action in the context of the severe and persistent underfunding.

The funding situation started to improve in the mid-2000s, following two developments. First, Poland’s accession to the European Union (EU) in 2004 provided the opportunity for PAS institutes to participate in the Fifth and Sixth Research Framework Programs of the European Commission.⁵¹ Second, with the 2010 act, two research funding agencies were created: the National Center for Science (Narodowe Centrum Nauki, NCN) for basic research, and the National Center for Research and Development (Narodowe Centrum Badań i Rozwoju, NCBiR) for applied research. The improvement of the funding situation via additional grant monies is illustrated by the fact that, in 2014, the budget of PAS institutes stood at 44 percent project funding (47 percent statutory funding) compared to 25 percent project funding in 2005 (75 percent statutory funding).⁵² It is also noteworthy that, in 2005, a new Ministry of Science and Higher Education (MNiSW) took over the portfolio of KBN, which was subsequently dissolved.

Regarding the theoretical categories introduced above, the funding of PAS provides an interesting example of both layering and displacement (Figure 1). If KBN funding rules had directly replaced the existing PAS funding rules in 1990, we would have observed displacement right away. Yet, the existing PAS funding rules were left intact, although challenged by new and additional KBN rules.⁵³ Therefore, we observe layering of new funding rules on top of the existing ones. When this “double authority” ended in 1997, the old PAS rules were effectively replaced by the KBN rules. Therefore, at a later stage of the historical development, we observe displacement. Since the new performance-based funding rules were imported from Western countries, where such rules had been introduced already in the 1980s and 1990s, the mechanism on which displacement was based was importation of foreign rules.⁵⁴

So, the gradual process of change with regard to PAS funding involves layering and displacement, which occurred one after the other. This finding is in line with other studies in the tradition of historical institutionalism.⁵⁵

Another, perhaps more important, insight pertains to the research puzzle of why the PAS seems to have undergone little institutional change (“dinosaur”). This section has shown that new KBN funding rules could not be properly implemented due to severe budget cuts that rendered performance-based evaluations ineffective. Hence, the layering of KBN funding rules could have little behavioral effect. Even some years later, when the KBN funding rules had finally displaced the former PAS regulations, the severe funding crisis reactivated behavioral patterns from the socialist past, and thus had the unintended effect of preserving the relationship between the PAS leadership and PAS institutes based on old formal rules.

Institutional change became transformative after the mid-2000s, when the increasing amounts of grant monies redefined the relationship between the PAS headquarters and the PAS institutes. In contrast to the situation up until the early 2000s, when the PAS headquarters successfully intervened with the KBN on the behalf of the PAS institutes, it could not do so with regard to the many funding agencies from which the institutes, or even individual researchers, started to obtain their resources. The PAS institutes began orienting their behavior and practices more and more to conform to the regulations of new funding agencies, such as the European Commission in the context of the Research Framework Programs. Consequently, the rules set by the PAS headquarters and the ministry became less relevant. Nowadays, annual evaluations conducted by the PAS headquarters are mostly symbolic. Thus, the strong growth of project-based, non-statutory funding on the one hand and the decline of statutory funding on the other hand, are key to understanding how the new PAS funding rules finally got traction: “New rules are attached to existing ones, thereby changing the ways in which the original rules structure behavior.”⁵⁶

Establishing New PAS Institutes

Transformative institutional change at PAS was stifled also by the issue of property rights. During socialist rule, legal ownership of land, buildings, and equipment was in the hands of the state.⁵⁷ When the socialist Polish state collapsed in 1989, the PAS institutes were not legal entities; hence, by definition, the PAS headquarters was the proprietor of all assets. All matters concerning buildings, laboratories, and scientific instrumentation had to be negotiated within the powerful PAS headquarters.

This situation started to change with the 1997 PAS act, which included the possibility of granting legal status to PAS institutes. An extensive legal discussion followed, concluding with the decision of the PAS president in 2001 to transfer

all movable goods to the institutes and to lend them their land and buildings.⁵⁸ Even after the 1997 PAS act, the PAS headquarters considered itself responsible for the PAS institutes, although the KBN had been charged with the overall coordination of the Polish research organizations.

Another property rights reform occurred several years later, with the 2010 PAS act, which aimed at making a better separation between assets managed by the PAS headquarters and the PAS institutes. Yet, the PAS headquarters remained in a powerful position even under the 2010 law, because PAS institutes were required to submit proposals to the PAS headquarters and not the Ministry of Science and Higher Education regarding the transfer of property rights. Between 2010 and 2014, 63 PAS institutes submitted such proposals, 52 of which were approved.⁵⁹

The issue of property rights is important for setting up new institutes. During socialist rule, new institutes and departments were basically founded on the initiative of the PAS headquarters. In contrast, the 1997 PAS law stated that the PAS headquarters could establish new research centers and departments, but setting up new institutes required permission from KBN. Similar to the situation of the funding arrangements, this led to a double authority of both KBN and PAS headquarters, with the result that no new PAS institutes were founded after 1997.⁶⁰

The 2010 PAS act modified this situation in that the right to establish research centers or departments was shifted from the PAS headquarters to the PAS institutes. Founding new institutes still required the permission of the ministry. If the PAS headquarters wished to establish a new institute, it had to equip it with the necessary buildings, equipment, and staff. All property rights had to be transferred immediately to the institute to prevent future conflicts with the PAS headquarters. Yet, although the PAS headquarters was further weakened and the independence of the PAS institutes strengthened, its right to establish new institutes in consultation with the ministry remained.

Regarding the theoretical categories introduced above, we observe layering of new formal rules on top of existing ones (Figure 1). The former PAS rules regarding setting up new institutes were complemented by new rules stipulating that the ultimate political decision was in the hands of KBN and later the ministry. In contrast to the funding arrangements examined above, this “double authority” is still in place today.

With respect to the research puzzle of why the PAS seems to have undergone little institutional change (“dinosaur”), this section has shown that the PAS headquarters, including its president, is still a powerful actor with important administrative competencies. The fact that the PAS headquarters lost some of its rights, particularly regarding the foundation of new research centers and departments, indicates that at this level the new political elites were strong enough to exchange existing rules for new ones. Yet, regarding the decision where to invest scarce resources via entirely new institutes, the PAS headquarters has retained its function as an umbrella organization.

PAS as a Learned Society

Another important aspect in the gradual change of PAS is its function as a *learned society*. As outlined above, between 1989 and 1997, the PAS statutes, and thus the socialist governance rules, were left intact. This changed with the 1997 PAS act, which restored the PAS as a *learned society* of independent scientists and scholars.⁶¹ In fact, the PAS was returned to the situation that obtained before World War II. More specifically, the PAS president was reconstituted as the single manager in charge; the political position of the secretary general was abolished, along with the scientific secretaries of each division. Instead, a representative of each scientific division was elected, and the presidium took over the competencies of the secretary general. Thus, the principles of democracy and autonomy of science were legally codified.

Yet, as outlined above, changing formal rules is one thing, but behavioral changes are another thing. The non-alignment of the former with the latter is evident here: at the time of the passing of the 1997 PAS act, all academy members had been socialized under socialist rule; none of them had witnessed the academy as an independent academic association of scientists and scholars. Unsurprisingly, many if not most of the academy members continued to favor the old over the new rules. In fact, the existing membership proved to be a major liability when it came to embracing the reforms put forward by the 1997 PAS act.

The 2010 PAS act addressed the issue of rejuvenating the PAS membership by introducing a member status with no voting rights: “passive emeritus member.”⁶² The new status applied automatically to all members when they turned 70.⁶³ Since 70 percent of the 190 PAS members with voting rights were older than 75 years in 2008, the new rules were highly effective in curtailing the influence of the old socialist scientific elite at PAS. The passive emeritus members were also blocked from joining the council of curators, which is responsible for the election of the directors of PAS institutes and the performance evaluations.

Regarding the theoretical categories introduced above, we observe both displacement and layering (Figure 1). First, returning to the pre-socialist function of the Academy as a learned society replaced the former influence of the Communist party with that of scientists and scholars. The relevant mechanism is thus reactivation, because previously suppressed or suspended possibilities were reinstated. Second, adding a non-voting membership category is clearly a case of layering, because it leaves the existing membership categories intact but adds a new one on top of them.

With respect to the research puzzle of why the PAS seems to have undergone little institutional change (“dinosaur”), this section has shown that the formal reinstatement of the former function of the PAS as a learned society was not accompanied with behavioral changes at the membership level because all PAS members were elected under socialist rule, and thus most of them favored the institutional status quo rather than

embracing the new rules. It took more than 20 years to curtail the voting rights of the socialist scientific elite at PAS, clearly one of the reasons that earned the academy its nickname “dinosaur.” The change in membership categories does not guarantee that every new and younger PAS member will automatically embrace the new formal rules. However, the likelihood of behavioral changes at PAS is higher since the power of older members, who had been socialized in the socialist era, has been formally delimited by the reform.

PROCESSES OF GRADUAL INSTITUTIONAL CHANGE WITHIN THE POLISH ACADEMY OF SCIENCES IN THE POST-SOCIALIST ERA

The Polish Academy of Sciences appears to be a stable institution. Founded during the Stalinist era, it has managed to survive the collapse of socialism and is still an important contributor to basic research in Poland. These facts pose an interesting puzzle: how to explain the institutional stability of PAS (“dinosaur”) in face of the sweeping societal transformations in its political and economic environments.

As outlined in this paper, this question can be answered by reference to theoretical concepts (layering, displacement) introduced by the historical institutionalism literature. In addition, this paper extended the explanatory power of this theoretical approach in one important regard: the scarcity of resources. As in other CEE countries, investment in science and research decreased significantly in Poland after 1989.⁶⁴ In the case of PAS, severe budget cuts in the early 1990s rendered new governance instruments ineffective. Even worse, the severe funding crisis of the 1990s and early 2000s reactivated behavioral patterns from the socialist past, and thus had the unintended effect of preserving the relationship between the PAS leadership and PAS institutes. The scarcity of resources hindered legal changes in becoming transformative, as did the long-time unresolved issue of property rights. The example of funding for PAS institutes shows that new formal rules cannot be properly implemented in times of scarce budgets.

The analysis started from the assumption that an organization, such as PAS, is subject to constant change as newly introduced formal rules are enacted in its changing social, political and economic environments. In order to detect processes of gradual change, we identified significant historical periods and relevant institutional functions of PAS. Next, the theoretical framework was used to analyze a comprehensive empirical dataset with regard to the processes and mechanisms of gradual institutional change.

First, we found that after the collapse of state socialism, the existing PAS funding rules were left intact, but new KBN rules were added on top of them. Therefore, we observe layering of new funding rules in the first post-socialist period, indicating considerable power of the old scientific elite that came to power during socialism. This “double authority” ended with

the new PAS law in 1997, and subsequently the old PAS rules were effectively replaced. Therefore, in the second post-socialist period, we observe displacement via importation.

Second, we focused on the PAS as an umbrella organization and on its competence to set up new PAS institutes. The formal rules inherited from socialism were complemented by new rules placing the ultimate decision in the hands of the ministry. This is another instance of layering of new formal rules on top of existing ones, and this “double authority” is still in place today.

Third, we analyzed the changes in the PAS as a learned society. This function was restored to its prewar design with the 1997 PAS law, constituting a case of displacement via reactivation. Later, the addition of a new non-voting membership category in the 2010 PAS law is clearly a case of layering, because it leaves the existing membership categories intact but adds a new one on top of them.

In addition to the identification of processes and mechanisms of gradual institutional change within the PAS over the past 25 years, our analysis yielded new insights into the complex relation between formal rules and behavioral effects. Formal rules are not automatically implemented and enacted by actors in their everyday behavior and decisions. Rather, our analysis of the PAS has exposed various difficulties within this process, especially regarding the power balance between old and new elites.

The PAS was led for a long time by a powerful scientific elite that managed to save some of the PAS’s competences despite the post-socialist reforms intended to transfer these competences to the new ministry (first KBN, then MNiSW). Regarding the competence to set up new PAS institutes, we have shown that the PAS headquarters is still a powerful actor with important administrative competencies. Another related aspect concerns voting rights in the reinstated society of scientists and scholars. While the formal influence of the Communist party has been pushed back following the 1990 act, real behavioral changes at this level could occur only after the 2010 act when older members lost their former voting rights, which they had used to effectively block any substantial organizational and scientific renewal of the PAS after 1989. Most important, our analysis has highlighted the importance of sufficient resources backing the changes in formal rules.

Besides adding new insights into the relation between the implementation of new rules and the availability of resources to the field of institutional change, these insights may be relevant to other fields of study. Scholars of implementation research have voiced their interest in including aspects of organization studies in order to understand how policy is put into practice. This would require “a focus on the technical and procedural activities of putting policy into action.”⁶⁵ Our study has shown that by focusing on the technical and procedural details of formal rule changes and their implications for the targeted institution, we can identify relevant factors of implementation. One factor, already covered in the historical institutionalism literature, is the power of veto players (old

scientific elite) to block the implementation of new rules. Another factor, which has not yet been discussed in this literature so far, is the amount of financial and personnel resources needed to implement new rules. This issue could certainly be of interest to the fields of institutional change as well as implementation research.

At the same time, our study has shown that shifting the focus of historical-institutionalist studies from Western institutions to post-socialist countries has its merits. The specific characteristics of post-socialist environments offer an interesting context for institutional change and the Academy as a genuinely socialist institution is an interesting subject for case studies. Both can be found not only in Poland. Since all the CEE socialist countries adopted the Soviet model of science during socialist rule, their science systems at the point of status quo 1989 looked very similar, as did the form and function of their academies. However, what happened to these academies after 1989 varied among CEE countries: some were restructured, some were abolished, most were left intact. This combination of similar contexts and various outcomes has enormous research potential. Future studies could use the methodological framework developed in this study to analyze the development of other post-socialist academies with special attention to the power of scientific elites and the availability of financial resources. Possible follow-up questions could be: Did the process of lustration in the Czech Republic affect the scientific elites of the Academy? Did the even lower levels of research funding in Bulgaria hinder reforms in the Academy more severely than in Poland? These and other questions need to be answered in future studies.

In this study, we have focused on developments in post-socialist Poland and the Polish Academy of Sciences. Overall, we found that there has been change inside this organization—mostly gradual, and not yet transformative. These gradual changes were explained with reference to the concepts of layering and displacement. Nevertheless, we cannot call the PAS a transformed institution. The PAS remains a cornerstone of the Polish science system, although its role and function in the post-socialist era has not fully evolved. As a case of institutional change, the PAS lies between radical transformation and path-dependent continuation. As a research-performing organization, the PAS remains a “dinosaur”: a relic from a bygone era; yet a still meaningful actor.

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Problems of Post-Communism for their helpful comments. We are particularly grateful for the advice and input given by the journal's associate editor, Dr. Sherrill Stroschein.

Notes

1. Steffi Heinecke, "The Gradual Transformation of the Polish Public Science System," *PLoS ONE* 11 (2016): e0153260. doi:10.1371/journal.pone.0153260. Current data: Główny Urząd Statystyczny, *Rocznik Statystyczny Rzeczypospolitej Polskiej 2016* (Warsaw: Central Statistical Office), 425–27.
2. Relevant data on PAS include (a) number of scientific staff at PAS institutes (in full-time equivalents): 1995: 8,089; 2000: 7,233; 2005: 5,681; 2010: 6,008; 2015: 7321; and (b) funding at PAS institutes (gross expenditure on research and development, in million PLN, inflation-adjusted) 1995: 632.38; 2000: 723.82; 2005: 860.3; 2010: 1233.8; 2015: 1554.6, as published in Heinecke, "Gradual Transformation of the Polish Science System."
3. A[ndrzej] Talaga, "Polska Akademia Nieprzydatności," *Rzeczpospolita*, March 14, 2012.
4. Slavo Radosevic and Benedetto Lepori, "Public Research Funding Systems in Central and Eastern Europe: Between Excellence and Relevance," *Science and Public Policy* 36 (2009): 662; Jaan Masso and Kadri Ukrainski, "Competition for Public Project Funding in a Small Research System: The Case of Estonia," *Science and Public Policy* 36 (2009): 683–95.
5. Benedetto Lepori, Jaan Masso, Julita Jablecka, Karel Sima, and Kadri Ukrainski, "Comparing the Organization of Public Research Funding in Central and Eastern European Countries," *Science and Public Policy* 36 (2009), 675.
6. Kathleen Thelen, "How Institutions Evolve: Insights from Comparative Historical Analysis," in *Comparative Historical Analysis in the Social Sciences*, ed. James Mahoney and Dietrich Rueschemeyer (Cambridge: Cambridge University Press, 2003).
7. Wolfgang Streeck and Kathleen Thelen, eds., *Beyond Continuity: Institutional Change in Advanced Political Economies* (Oxford: Oxford University Press, 2005); James Mahoney and Kathleen Thelen, "A Theory of Gradual Institutional Change," in *Explaining Institutional Change: Ambiguity, Agency, and Power*, ed. James Mahoney and Kathleen Thelen (Cambridge: Cambridge University Press, 2010).
8. Peter B. Evans, Dietrich Rueschemeyer, and Theda Skocpol, eds., *Bringing the State Back In* (New York: Cambridge University Press, 1985); James G. March, and Johan P. Olsen, *Rediscovering Institutions: The Organizational Basis of Politics* (New York: Free Press, 1989); Douglass C. North, *Institutions, Institutional Change, and Economic Performance* (Cambridge: Cambridge University Press, 1990); Neill Fligstein, *The Transformation of Corporate Control* (Cambridge, MA: Harvard University Press, 1990); John L. Campbell, "Institutional Analysis and the Role of Ideas in Political Economy," *Theory and Society* 27 (1998): 377–409.
9. Wolfgang Streeck and Kathleen Thelen, "Introduction: Institutional Change in Advanced Political Economies," in Streeck and Thelen, eds., *Beyond Continuity*, 10.
10. See, for example, Paul J. DiMaggio and Walter W. Powell, "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields," *American Sociological Review* 48, no. 2 (1983): 147–60; Michael T. Hannan and John H. Freeman, "Organizations and Social Structure," in *Organizational Ecology*, eds. Michael T. Hannan and John H. Freeman, ch. 1 (Cambridge, MA: Harvard University Press, 1989); Paul Pierson, "Increasing Returns, Path Dependence, and the Study of Politics," *American Political Science Review* 94, no. 2 (2000): 251–67. According to Mahoney and Thelen in "A Theory of Gradual Institutional Change" (p. 7), the different varieties of institutionalism "provide answers to what sustains institutions over time as well as compelling accounts of cases in which exogenous shocks or shifts prompt institutional change. What they do not provide is a general model of change, particularly one that can comprehend both exogenous and endogenous sources of change."
11. Thelen, "How Institutions Evolve"; Streeck and Thelen, "Introduction: Institutional Change in Advanced Political Economies"; Mahoney and Thelen, "A Theory of Gradual Institutional Change."
12. Mahoney and Thelen "expect incremental change to emerge [...] in the 'gaps' or 'soft spots' between the rule and its interpretation or the rule and its enforcement." Mahoney and Thelen, "A Theory of Gradual Institutional Change," 14.
13. Kathleen Thelen and James Conran, "Institutional Change," in *The Oxford Handbook of Historical Institutionalism*, ed. Orfeo Fioretos, Tullia G. Falletti, and Adam Sheingate (Oxford: Oxford University Press, 2016), 57.
14. Mahoney and Thelen, "A Theory of Gradual Institutional Change," 16–18.
15. *Ibid.*, 16.
16. Streeck and Thelen, "Introduction: Institutional Change in Advanced Political Economies," 24.
17. *Ibid.*, 21.
18. Colin Crouch and Maarten Keune, "Changing Dominant Practice: Making Use of Institutional Diversity in Hungary and the United Kingdom," in *Beyond Continuity: Institutional Change in Advanced Political Economies*, ed. Wolfgang Streeck and Kathleen Thelen (Oxford: Oxford University Press, 2005), 83–102.
19. Streeck and Thelen, Streeck and Thelen, "Introduction: Institutional Change in Advanced Political Economies."
20. Mahoney and Thelen, "A Theory of Gradual Institutional Change," 12–14.
21. Ustawa z dnia 30 października 1951 r. o Polskiej Akademii Nauk. *Dz.U.* R.P. nr 57, poz. 391; Ustawa z dnia 17 lutego 1960 r. O Polskiej Akademii Nauk. *Dz.U.* nr 10, poz. 64, Art. 12; Ustawa z dnia 25 kwietnia 1997 r. o Polskiej Akademii Nauk. *Dz.U.* nr 75, poz. 469; Act of 30 April 2010 on the Polish Academy of Sciences, *Journal of Laws* [Dz. U.], No. 96/2010, Item 619, of 4 June 2010.
22. *Sprawozdanie PAN*. Polska Akademia Nauk: Biuro Upowszechniania i Promocji Nauki w Kancelarii PAN 1989–2015; *Statut Polskiej Akademii Nauk*. Załącznik do uchwały nr 8/2010; Zgromadzenia Ogólnego PAN z dnia 24. listopada 2010r.; *Annual Report*, Polish Academy of Sciences, Office of Science Promotion, Years 2009–2015.
23. *Sprawozdanie PAN*. Polska Akademia Nauk: Biuro Upowszechniania i Promocji Nauki w Kancelarii PAN 1989–2015; Główny Urząd Statystyczny, *Rocznik Statystyczny Rzeczypospolitej Polskiej 1992–2015* (Warsaw: Central Statistical Office); Główny Urząd Statystyczny, *Nauka i technika 1992–2015*. Warsaw: Central Statistical Office.
24. Geoffrey Hosking, *The First Socialist Society: A History of the Soviet Union from Within* (Cambridge: Harvard University Press, 2d edition, 1992); Loren R. Graham, *Science and Philosophy in the Soviet Union* (New York: Vintage Books, 1974); Loren R. Graham, *Science in Russia and the Soviet Union: A Short History* (Cambridge: Cambridge University Press, 1994).
25. Because of the Polish partition, which lasted from 1795 to 1918, separate academies developed in the Polish territories. In the territories belonging to Prussia, no Polish universities existed and all scientific endeavors were oriented toward German culture. In the parts belonging to Russia and Austria, universities and science developed more independently. See Norman Davies, *God's Playground: A History of Poland*, Volume II, 1795 to the Present (Oxford: Oxford

- University Press, 1981), 231. Under Austrian rule, the PAU was founded in 1872 “as a child of the Scientific Society, which was linked with the university of Cracow.” Under Russian rule, the TPN was founded in 1800. See Julyan Buyno, “The Polish Academy of Sciences 1873–1948,” *The Slavonic and East European Review* 27, no. 69 (1949): 571. For more details, see Norman Davies, *God’s Playground*, ch. 8.
26. Buyno, “The Polish Academy of Sciences,” 571.
 27. *Ibid.*, 573.
 28. Piotr Hübner, “The Last Flight of Pegasus: The Story of the Polish Academy of Science and Letters and of the Warsaw Scientific Society, 1945–1952,” *East European Politics and Societies* 13 (1998): 71–116.
 29. Although the model of the Soviet science system was adapted throughout the Eastern bloc after World War II, there were notable differences among the adaptations in various countries, especially in the emphasis on basic or applied sciences and the relationship between the first and the third functions. See Jochen Gläser and Werner Meske, *Anwendungsorientierung von Grundlagenforschung? Erfahrungen der Akademie der Wissenschaften der DDR* (Frankfurt/Main: Campus Verlag, 1996), 19.
 30. Membership is granted for life, and new memberships are available only after the death of a member; this rule explains the high average age of Academy members.
 31. Leszek Kuźnicki, “The Section of Biological Science of the Academy of Sciences over the Last 25 Years,” *The Review of the Polish Academy of Sciences* 1 (1978): 23–24.
 32. Ustawa z dnia 17 lutego 1960 r. O Polskiej Akademii Nauk, *Dz.U.*, nr 10, poz. 64, Art. 12.
 33. Vera Rich, “Polish Academy of Sciences: Foreign Travel Rights Restricted,” *Nature* 299 (1982): 768.
 34. Out of the 500 research projects planned for the 1986–1990 period, for example, 160 were directed toward the needs of the national economy and 350 toward scientific progress. Ewa Hoffmann, *Kalendarium: Polska Akademia Nauk, 1952–2002* (Warsaw: Kancelaria Polskiej Akademii Nauk, 2002), 59, 174.
 35. “In the 1970s and 1980s the Academy’s scientific committees became the principal element in the scientific consultation system for the state authorities and they operated as a collective body of experts for the government.” *Zakład Narodowy*, 1985: 18.
 36. Kuźnicki, “The Section of Biological Science,” 22.
 37. Hoffmann, *Kalendarium*, 8.
 38. Renate Mayntz, “Socialist Academies of Sciences: The Enforced Orientation of Basic Research at User Needs,” *Research Policy* 27 (1998): 786.
 39. Aleksander Matejko, “Planning and Tradition in Polish Higher Education,” *Minerva* VII, no. 4 (1969), 641.
 40. *Zakład Narodowy*, 1985, 17.
 41. Mahoney and Thelen, “A Theory of Gradual Institutional Change,” 20.
 42. Stefan Amsterdamski and Julita Jablecka, “Higher Education and Research in Poland: The Inherited Situation and the Reforms,” in *Transformation of the National Higher Education and Research Systems of Central Europe*, ed. Stefan Amsterdamski and Julita Jablecka (Vienna: Institut für die Wissenschaften vom Menschen, 1993), 53; Hoffmann, *Kalendarium*, 192.
 43. Kostadinica Simeonova, “The Two-Edged Sword of Autonomy: Changes in the Academy–Institute Relations,” in *East European Academies in Transition*, ed. Renate Mayntz, Uwe Schimank, and Peter Weingart (Dordrecht: Kluwer Academic Publishers, 1998): 126.
 44. *Ibid.*
 45. The available empirical data suggests that funding was cut in all sectors of the Polish science system. There has been no significant change in the percentage of PAS funding (1995: 14.5 percent of all funding went to PAS; 2005: 17 percent; 2015: 18 percent). Data on funding before 1995 is highly unreliable due to inflation and the validity of data from the socialist era. Heinecke, “Gradual Transformation of the Polish Science System.”
 46. Hoffman, *Kalendarium*: 226
 47. *Ibid.*
 48. Polish Academy of Sciences, *Annual Report of the Polish Academy of Sciences* (Warszawa: Office of Science Promotion, 1994), 1.
 49. Hoffman, *Kalendarium*, 263.
 50. Polish Academy of Sciences, *Annual Report of the Polish Academy of Sciences* (Warszawa: Office of Science Promotion, 2001), 7.
 51. Lepori et al., “Comparing the Organization of Public Research Funding in Central and Eastern European Countries.” The process of Europeanization is worth mentioning here, although its effects are not as strong as often portrayed. Considering the low participation rates of Polish research entities within the Fifth and Sixth Research Framework of the EU, this is far from being the most important factor. On the contrary, one could argue that the lack of success within EU funding programs hints at the missing adaptation of Polish research institutes to the practices and expectations prevailing in EU programs.
 52. Narodowe Centrum Nauki, *Annual Report 2012* (Warsaw, 2013). A new law on higher education is currently in the making in response to demographic developments and the shrinkage of the private higher education sector, leading to the “remonopolization of the system by the tax-based public sector and the gradual decline of the private sector.” Marek Kwiec, “Structural Changes in the Polish Higher Education System (1990–2010): A Synthetic View,” *European Journal of Higher Education* 4 (2014): 266–280.
 53. Minor changes by the PAS Presidium and executive decisions by the Secretary to reorganize the PAS were ineffective. One such ineffective changes was the liquidation of MON (the delegation of the Ministry for National Security responsible for cooperation with science) at the PAS, which was initiated by the general secretary, Leszek Kuźnicki, in April 1990. Hoffman, *Kalendarium*: 192.
 54. Ulf Sandström, Ulf Heyman, and Peter van den Besselaar, “The Complex Relationship between Competitive Funding and Performance,” in *Context Counts: Pathways to Master Big and Little Data*, ed. Ed Noyons (Leiden: CWTS, 2014), 523–33.
 55. Olof Hallonsten and Thomas Heinze, “Institutional Persistence through Gradual Organizational Adaptation: Analysis of National Laboratories in the USA and Germany,” *Science and Public Policy* 39 (2012): 450–63; Olof Hallonsten and Thomas Heinze, “Preservation of the Laboratory Is Not a Mission: Gradual Organizational Renewal in National Laboratories in Germany and the USA,” in *Innovation in Science and Organizational Renewal: Historical and Sociological Perspectives*, ed. Thomas Heinze and Richard Münch (Basingstoke: Palgrave Macmillan, 2016), 117–46.
 56. Mahoney and Thelen, “A Theory of Gradual Institutional Change,” 16.
 57. János Kornai, “What the Change of System from Socialism to Capitalism Does and Does Not Mean,” *The Journal of Economic Perspectives* 14 (2000): 27–42.
 58. Polish Academy of Sciences, *Annual Report 2001*, 11. In 2002, the annual report states: “Continuation of the process of Academy property being turned over to institutions with corporate legal status: buildings, constructions, and land were turned over to 11 institutes.” Polish Academy of Sciences, *Annual Report 2002*, 6.
 59. Polska Akademia Nauk, *Sprawozdanie 2014* (Warsaw: Polska Akademia Nauk, 2015): 292.
 60. Heinecke, “Gradual Transformation Polish Science System.”
 61. Ustawa z dnia 25 kwietnia 1997 r. o Polskiej Akademii Nauk, *Dz.U.*, nr 75, poz. 469, rod. 2/Art. 11.
 62. Justification of the Act of 30 April 2010 on the Polish Academy of Sciences. 2012. Online: www.nauka.gov.pl/g2/oryginal/2013_05/9ca6e60d5680da29fd4d94d2b851f076.pdf (last accessed: 05 June 2014).

63. See Justification of the Act of 30 April 2010, 2.
64. Heinecke, "Gradual Transformation Polish Science System."
65. Jill Schofield, "Time for a Revival? Public Policy Implementation: a Review of the Literature and an Agenda for Future Research," *International Journal of Management Reviews* 3 (2001), 259; see also: Malcolm L. Goggin, Ann O'M. Bowman, James P. Lester and Laurence J. O'Toole, Jr., *Implementation Theory and Practice:*

Toward a Third Generation (Glenview, IL: Scott Foresman/Little Brown, 1990); Harald Saetren, "Facts and Myths about Research on Public Policy Implementation: Out-of-Fashion, Allegedly Dead, But Still Very Much Alive and Relevant," *The Policy Studies Journal* 33 (2005), 559–82; Peter Hupe "What Happens on the Ground: Persistent Issues in Implementation Research," *Public Policy and Administration* 29 (2014), 164–82.