# German Unification as a Steamroller? The Institutes of the Academy of Sciences of the GDR in the Period of Transformation

*Hans-Georg Wolf*

## 1 Introduction

One of the results of the unification of East and West Germany was the dissolution of the East German Academy of Sciences (*Akademie der Wissenschaften*, AdW). The fate of this organization can be examined on different analytical levels. According to the general logic effective during the process of unification, the AdW as a whole fell victim to the "transfer of institutions" (Lehmbruch 1993) from West to East Germany. Mayntz's analysis (1992; and in this volume) concentrates on this analytical level. The fate of the AdW set certain conditions for the development of its single research laboratories. However, the paths on which these institutes developed were quite dissimilar, resulting in a broad range of organizational "success" and "failure." This chapter employs the concept of "Coping with Trouble" for an examination of these different paths, adopting the perspective of the institutes as focal organizations to analyze their coping with the "trouble of unification."[1]

After a brief description of the AdW and the transformation process (1), the extent and character of "trouble" will be discussed (2). The changes connected with the revolution in the German Democratic Republic (GDR) and the unification will be interpreted as an abrupt and extraordinarily profound

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1 The article will not be concerned with the fact that the institutes had to already cope with trouble during the years of the GDR; nor will it take into account that unification also brought them various kinds of *relief from trouble.*

change in the organizational environment of the institutes of the AdW, which was aggravated by far-reaching changes within these institutes. Nevertheless, I will argue (3) that a certain scope of action was available to them. How they actually tried to cope with the menace will be illustrated by the example of three institutes. Referring to a metaphor used by various commentators, I will conclude (4) that it is not appropriate to depict the transformation process as a "steamroller," as an externally induced catastrophe which did not leave the affected institutes with any coping opportunities. Rather, differentiation is necessary: Coping behavior did have a significant impact on the organizational fate, albeit only in a subgroup of institutes.

## 1.1 The AdW within the Research System of the GDR

Comprising a society of scholars and 60 autonomous research laboratories with 18,285 R&D employees in 1989 (cf. Stifterverband 1990: 70), the AdW employed the largest percentage of East German non-industrial R&D personnel. Its inner structure was strictly hierarchical. Its Presidium had executive authority over both the society of scholars, subdivided into "classes," and the research institutions, subdivided into "research departments" (*Forschungsbereiche*[2]). Internally, most of the institutes consisted of several hierarchical levels. They were subdivided into departments (*Bereiche*) which in turn consisted of smaller sections (*Abteilungen* and *Arbeitsgruppen*).

Very often the AdW was perceived as the principal center for fundamental research of the GDR, and that is how it presented itself in official texts (cf. Academy of Sciences/ UNESCO 1985: 41; AdW 1987: 136). This seems to be the reason why, during the unification period, the AdW as a whole was frequently associated with West Germany's Max Planck Society (MPG), as if it were the MPG's East German counterpart in basic research (see among others: Terpe, cited in: *Berliner Zeitung* 1990; Püttner 1992). However, it seems that, at least during the academy's final years, the share of basic research diminished significantly. In accordance with the "primacy of economy

2 From June 1989 on, the *Forschungsbereiche* were labelled *Wissenschaftsgebiete* (see Wangermann 1990). They included: physics; mathematics and informatics; geography, geology, and space research; chemistry; biology and medicine; social sciences. In the GDR as in other socialist states, the label "social sciences" also included the humanities.

over science and technology," a basic tenet of the SED's science policy (cf. Lauterbach 1976: 26), the political leadership launched several initiatives to push the AdW in the direction of applied research. From 1985 on, the AdW was obliged to secure at least 50% of its research funding from industry. Most of the institutes have developed intensive relations to state-owned industrial conglomerates known as combines (*Kombinate*). Many of the institutes performed tasks which in Western countries would be considered typical industrial R&D.[3] It was certainly inappropriate, therefore, to identify the AdW with the MPG. Although quite a number of research groups performing pure basic research did exist, the majority of them was nearer to applied research than to basic research. In spite of numerous difficulties, according to many observers (see for instance the statement of the President of the West German Science Council in *Der Spiegel* 1991: 40) several disciplines of the AdW performed outstandingly well, in fundamental and in applied research.

## 1.2 The AdW and the Process of German Unification

In a brief, general overview of the transformation process since autumn of 1989, three phases can be distinguished analytically.

The *first period,* beginning with the peaceful revolution, was one of *inner transformations* within the AdW. In most of the institutes, new councils for codetermination were created (as a rule by democratic elections). On the one hand, so-called *Personalräte* (personnel councils) were put up. Representing the researchers as well as the staff of the institutes, these councils took the place of the *Gewerkschaftsleitungen* (the committees of the GDR's trade union on the level of the institutes; cf. Gläser 1992: 39). On the other hand, *Wissenschaftliche Räte* (scientific councils) were established.[4] Reserved for the scientific personnel and members of the management, they served as advisory bodies to the director and had a say especially in decisions on the scientific

3 For instance, a member of the Science Council called the three large chemistry institutes in Berlin-Adlershof the "national centers of chemical industrial research of the GDR" (interview dhw012193; translation by the author).

4 In some cases, these councils already existed before the revolution, but had no influence on the development of their institutes (cf. Gläser 1992: 39).

orientation and strategy.[5] In many cases, the influence of these councils within the institutes was rather large. However, since in this phase virtually no standardized rules existed, the actual distribution of power between personnel council, scientific council and director differed from one institute to another.

The leadership members of the institutes had to submit themselves to a confidence vote. By summer of 1990, about half of the directors of the institutes had been replaced (cf. Mayntz in this volume). The structure of the institutes was partly reorganized in some cases, as were the research agendas. But, without doubt, the period of inner reforms was too short for a fundamental redirection of the research; the same holds for major organizational changes. This phase was also marked by a significant weakening of hierarchical control between the higher organizational levels of the academy and the institutes.

During this first phase, most of the actors perceived the situation as one of changes going on within a sovereign national state, the GDR. However, this perception was gradually replaced by the anticipation of a quick unification. This anticipation became dominant at the latest when the conservative party alliance won the East German elections to the parliament (*Volkskammer*) on 18 March 1990. This was the beginning of the *second period* considered here, the period of *strategy formation.*

As it gradually became apparent to them that unification was imminent, the members of the institutes of the AdW realized that they had to prepare themselves for changing conditions in their environment. However, during the first half of 1990, the actual form this change might take remained uncertain. While a reduction of the academy's research personnel could be foreseen – and in fact the AdW itself started such reductions soon after the revolution – it was neither clear whether the academy as an association of research institutions would be sustained nor which public agency would be responsible for them (cf. Mayntz in this volume). The extent of the threat to the institutes remained unclear until the first days of July 1990, when one of two basic decisions on the future of the AdW was fixed: The West German Science Council[6] was officially engaged to evaluate the institutes and to give recom-

5 Gläser (1992: 39) gives an example of the task definition of a scientific council.

6 The Science Council, made up of officials from the federal and *Länder* governments and professors from various fields, advises the public authorities on higher education and research policy (see Krull 1992).

mendations about their worthiness of public support and financing. The Science Council started the evaluation procedure by sending the institutes an extensive questionnaire,[7] which was to be answered by the end of August. The other basic decision followed on 31 August 1990 (i.e. after the deadline of the questionnaire) when the Unification Treaty was signed. According to this treaty, the AdW as a combination of scholarly society and research association was to be dissolved. The newly created East German federal states (*Länder*) were to become responsible for the institutes of the academy situated in their respective territories. The temporary financing of these institutes was ensured up to the end of 1991.[8] The treaty also made clear that the East German research institutions were to be adapted to the "well-established methods and programs of research promotion" used in the Federal Republic (Art. 38; translation by the author).

Thus, from the end of August 1990 on, the future path of the institutes could be seen more clearly. Since the maintenance of the AdW's association of research laboratories as an autonomous research organization (like the MPG) was ruled out, each institute knew that its only options for the future were integration into the established West German structures or complete dissolution. More specifically, this meant that the scientific potential of the AdW was to be integrated into laboratories of the big extrauniversity research organizations (MPG and Fraunhofer Society, FhG[9]) or of other state-financed research institutions (Big Science Centers, institutes of the so-called *Blaue Liste*[10] and institutes financed directly by the federal government or by individual *Länder*). The only other possibility was integration into the university system or into the field of private R&D.

The beginning of the evaluation in September 1990 marked the start of the *third period* of the transformation process examined here, the process of *evaluation and implementation.* An Evaluation Committee and nine expert

7 Its 23 questions concerned the past research activities of the institutes and their ideas for their future research orientation.

8 Although this notion does not correspond exactly to the juridical facts, this part of the unification treaty has been called a "moratorium."

9 In contrast to the MPG, the FhG concentrates on application-oriented research.

10 The institutes of the *Blaue Liste* (blue list) are jointly funded by the federal government and the *Länder*.

groups were established by the Science Council.[11] These groups performed the main part of the evaluation procedure. They looked through the answers to the questionnaire, visited the institutes (between the end of September 1990 and February 1991), talked to the scientists employed there and tried to get an idea of the quality of their research work. The results were discussed within the expert groups and, later, in the Evaluation Committee. Finally, between January and July 1991, the General Assembly of the Science Council passed its recommendations, which were crucial for the future of the research laboratories of the AdW.[12]

Altogether, the Science Council recommended the foundation of about 100 new research institutes and branches of existing West German institutions in East Germany which were to integrate personnel from the AdW. These institutions employ approximately 7,500 people.[13] The number of the scientists and other employees of the research laboratories of the AdW had declined to 15,000 by September 1991;[14] therefore, according to the recommendations of the Science Council, roughly every second employee of the academy had a chance to get one of the new positions. Moreover, the Science Council proposed to transfer some 2,000 positions from the extrauniversity to the university sector. For this purpose, a special program financed jointly by the federal government and the new *Länder* was created – the *Wissenschaftler-Integrationsprogramm* (WIP). As to the types of research institutions suggested by the Science Council, there are only a few deviations from the established West German repertoire; in general, the established institutional forms of research organization and funding were reproduced.

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11 The vast majority of the evaluators came from West Germany, but professors from East Germany and from abroad took part in each group.

12 The Science Council evaluated some 130 East German research institutions, including all the extrauniversity research establishments. From the late 1970s up to 1990, the Science Council had only conducted some 40 evaluations in the Federal Republic of Germany (Krull 1992: 14); only in one case did these evaluations lead to the closure of an institute (Block/ Krull 1990: 435). This shows how extremely the evaluation of the East German institutes differed – in quantity *and* in quality – from earlier evaluations in the west.

13 Calculation by the author; derived from Wissenschaftsrat (1992).

14 This number is taken from documents of the *Koordinierungs- und Abwicklungsstelle* (KAI-AdW), a temporary agency set up for the purpose of controlling and coordinating the transformation of the AdW.

The employees of the institutes of the AdW had to find their way into this pattern of publicly funded institutions. Although the number of recommended positions sufficed for roughly half of the personnel, this half was not distributed evenly among the new institutions. Rather, with regard to the future of the 60 research establishments of the AdW, the recommendations of the Science Council embraced a broad range of different types of "organizational fate." Firstly,[15] there were six institutes whose *winding-up*[16] was recommended by the Science Council without providing any substitute worth mentioning (see Case Study 3 for an example). The vast majority of their personnel was not designated for further public support. Secondly, 28 institutes were intended to be *broken down* into smaller units, some of which were to receive public funds, others of which were not. A moderate percentage of the personnel of most of the institutes in this large group was to remain within the system of publicly funded research (in some cases, however, a rather high percentage could remain: cf. Case Study 1). The same holds for the third category, i.e. the five institutes that were to be completely integrated into existing West German research establishments. Fourthly, 21 institutes were recommended to be *converted* into newly founded research establishments. Their organizational integrity was to be maintained, but their organizational form was to be adapted to the established West German pattern. It was in this category that the highest general percentage of personnel was rehired. Nevertheless, in many cases the organizational conversion entailed a noticeable reduction in personnel (cf. Case Study 2). At the most, about ten institutes of the AdW were to be maintained without any significant reductions in personnel.

By and large, the recommendations of the Science Council have been carried out. Although numerous implementation problems did – and still do – exist and some recommendations were never realized, at least the aggregated flows of personnel from the former AdW to new extrauniversity institutes roughly correspond to the proposed numbers.

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15 The distinction between these different types can only be an analytical one – reality was, of course, less clear-cut.

16 The German word is *Abwicklung*, meaning liquidation or dissolution (see Young 1993, Footnote 4).

## 2 The Problems Facing the Institutes of the AdW

### 2.1 Affected Interests of the Institutes and Individual Researchers

If one wants to analyze which aspects of the unification process *troubled* the institutes, it is not just trivial to first consider their specific interests. *Firstly,* on the level of *corporate actors,* one can draw on the concept of reflexive interests which organizations pursue regardless of their specific functions. To put it briefly, these include "organizational survival, autonomy and growth" (Scharpf 1989: 45; Schimank 1992: 175 and Weyer 1993: 14-16 argue similarly). Applied to the institutes of the AdW, within the socialist state these interests were met to varying degrees. After a profound reorganization of the academy in the early 1970s (the *Akademiereform*), major organizational restructuring did not occur too frequently. Thus, the survival of the institutes was generally ensured, albeit on a resource level that often did not satisfy their demands. Most of the institutes also grew considerably after the reform. Their organizational autonomy, however, was narrowly limited.

Can the concept of reflexive interests also define the interests of the institutes of the AdW during the unification process? Quite remarkably, the fundamental interest of organizational *survival* was not shared by all of the institutes.[17] In their answers to the Science Council, approximately one quarter of the institutes did not express an unambiguous will to survive as intact organizations. Instead, they presented concepts for their disintegration into smaller units (see Case Study 2 for an example). Maybe this behavior was partly due to the fact that the institutes had no hope of finding a practicable way to survive within a unified Germany. Perhaps a more important reason can be found, however, in their organizational past: The *Akademiereform* had generated very heterogeneous research institutions. The individual character of the formerly autonomous institutes remained, and cooperation among them often did not work well.[18] Consequently, as soon as the change in the politi-

17 This seems contrary to basic tenets of organization theory; cf. Hage (1980: 425): "Any theory about the functioning of organization in an environmental context must start with the simple assumption that the organization's dominant coalition is interested in some kind of survival."

18 This observation is documented in many evaluation reports of the Science Council (see, for example, Wissenschaftsrat 1992: 94).

cal system gave them the chance, a number of subunits within the institutes made an effort to regain their organizational autonomy. In these cases, the concept of reflexive interests can be applied, but only on the level of organizational subunits which followed their individual interest in *survival.*

In an abstract sense, both of the other reflexive interests were probably pursued by all the institutes of the AdW. But some restrictions applied from the very beginning, compelling the institutes to lower their aspiration level. As to the goal of organizational *autonomy,* the dependence of research institutes upon public funds must be stressed (cf. among others: Mukerji 1989: 4). Since the possibility of transforming parts of the institutes into private enterprises was narrowly limited by the difficult economic situation, it was obvious that autonomy could only be achieved within a larger organizational setting (such as the MPG or the FhG). A limitation on autonomy would always exist, however, varying considerably among different institutional types.

The goal of organizational *growth* was obviously out of reach for virtually all the institutes. Since most critical examinations of the research laboratories of the AdW concluded that they were overstaffed (by West German standards), the institutes could only endeavor to maintain their size or to minimize its reduction.

*Secondly,* the interests of the *individual employees* were not necessarily identical with the interests of the institutes they were employed in. Since it seems to be even more difficult to define the basic (reflexive) interests individual actors pursue in any given situation (cf. Scharpf 1989: 45), I would like to base my argument upon the following simplifying assumptions for now: In the first place, the individual actors were interested in securing their regular income. In the second place, they were interested in a job that matched their personal qualifications and preferences (with regard to researchers: one that allowed them to follow their personal research interests). Sometimes these interests corresponded with the interests of the institutes, sometimes they did not (as illustrated in the case studies in Section 3).[19]

19 This relates to the interplay between individual and corporate actors within multilevel systems discussed in many contributions to this volume (see Braun; Schimank; Stucke).

## 2.2 Why Were These Interests Threatened?

My proposition is that the trouble which threatened the interests described above arose mainly in the second and third phase of the transformation process; the existential problems began during the advent of unification. The internal transformation after the revolution undoubtedly caused many problems for the institutes of the AdW. The process of democratization entailed disorder and heated discussions about questions of political involvement, thus impairing the research conditions within the institutes. Moreover, their economic situation was getting more and more precarious because most of the funds from industrial partners were being withdrawn. On the other hand, the budget of the academy was not seriously endangered in 1990 and 1991. Several months before the unification, the West German Ministry for Research and Technology (*Bundesministerium für Forschung und Technologie,* BMFT) already began to subsidize the AdW. Not a single institute of the AdW was closed before the end of 1991 (in fact, three institutes were founded during that period). Also, dismissals against the will of the employees were rare during the first phase. In most cases, those who did leave had found other employment or gone into retirement. In the second and third phases, however, the survival of the whole academy and its institutes as well as the jobs of all the employees became uncertain.

Concentrating on the second and third phases, how can we describe the "trouble" the institutes had to cope with? I will distinguish between the external and internal side of trouble.

### *2.2.1 External Trouble*

From the viewpoint of the institutes, the unification process can be conceptualized as environmental variation. Organization theory (cf. among others: Child 1972; Hannan/ Freeman 1977) provides various concepts of environmental variation, which – as Wholey and Brittain (1989: 869) have demonstrated – have three dimensions in common: *frequency, amplitude* and *predictability* of environmental change. The transformation considered here can be modeled as a single – and unique[20] – event, converting the institutional

20 Lehmbruch (1990: 464-467) gives a skeptical answer to the question whether there are historic precedents that could be called upon to analyze Germany's unification.

system of the GDR into that of unified Germany. As this is no matter of long-term analysis, the *frequency* and *predictability* of environmental change (does experience from the past help to anticipate future variation in the environment?) are not relevant measures.

*Amplitude*, however, seems suitable for demonstrating the great importance of this event. To show that the *amplitude* of the variation was very high, one can – again drawing on different concepts from organization theory (clearly summarized by Sharfman/ Dean 1991) – distinguish three dimensions which describe organizational environments: *Complexity*, *dynamism and stability*, and *resource availability*.

*Complexity* refers to "the level of complex knowledge that understanding the environment requires" (Sharfman/ Dean 1991: 683). During the years of the GDR, the institutes of the AdW were quite experienced in understanding the opportunities and hazards of their environment which, in this sense, was not very complex. But, from their viewpoint, understanding the emerging environment of unified Germany was an extremely complex task. Since communication between East and West Germany used to be very restricted, East German researchers possessed only limited knowledge about the organization of scientific research in West Germany (and vice versa). Nor were they experienced at undergoing external evaluations. Moreover, mere knowledge about the formal (legal and organizational) structure of the environment often does not suffice. Knowledge about informal structures, relevant actors and network connections within the field of research policy can be even more important. If one also takes into consideration the fast pace of the transformation process, it becomes evident that the situation brought a very high degree of complexity and uncertainty to the institutes – while at the same time very much was at stake.

Similarly, the unification process involved a switch from a comparatively *stable* to a dynamic environment. Though external (mainly: political) disturbances occurred time and again, the environment of the institutes of the AdW in the years of the GDR (after the *Akademiereform*) was stable enough to secure the survival of virtually all of them. In addition, the majority of researchers was employed in the AdW (often in only one institute) from the time they left university until they retired. That is why traditional structures persisted for a very long time within the academy. As many observers have noticed (see, for instance, *Nachrichten* 1991: 810), the research orientation given to an institute by its founder in the 1950s often survived without signifi-

cant modifications up to the 1980s.[21] A similar stability was no longer possible with the advent of unified Germany. Not only did it become difficult for the institutes to acquire the necessary knowledge about resources, the conditions for getting funds also changed over time or remained uncertain.[22] Thus, research institutes and individual researchers in Eastern Germany were (and still are) forced to adapt to dynamic changes of their environment much more frequently than before.

Finally, the unification process implied a fundamental change with regard to *resource availability*. The difference does not lie primarily in the total amount of available resources, but rather in their structure. Organizations are able to acquire resources to the extent that they are well adapted to the environment which supplies these resources. By and large, the institutes of the AdW were rather well adapted to the environmental conditions of the GDR; they had found suitable niches. Many of them performed highly specialized tasks lying within the immediate economic interest of the GDR; another – relatively small – group[23] had found niches allowing its scientists to concentrate on basic research. Individual researchers displayed a similar degree of specialization. In many cases, a specialization that matched the environmental requirements of the GDR became a mismatch under the circumstances of unified Germany (e.g. Case Study 3).

Additional problems were caused by the breadth of the transformation process. As the institutional upheaval in the course of the unification process simultaneously affected every subsector of the East German research system, the problems multiplied. A sharp decline of the research personnel took place in the sector of industrial R&D, the university sector and in all the other publicly-financed extrauniversity research institutions. Since no safe ground

21 Such persistence of a research orientation over a long time is not, of course, peculiar to the AdW, but has often been described in sociological studies. See, for example, Chubin/ Connolly (1982: 303).

22 For instance, the formal regulations of the WIP were modified several times. Under certain conditions, it was more attractive for an East German scientist to apply for funds from the labor office (which offered a special sponsorship program for them – a part of the job-creation program called *Arbeitsbeschaffungsmaßnahmen*, ABM) than for funds from the WIP. But the legal regulations concerning ABM also changed several times.

23 Among them the Institute of Solid-State Physics and Electron Microscopy and the Institute of High-Energy Physics.

could thus be found within the entire transformation process, deliberate coping behavior became much more difficult.

Environmental conditions changed not only with respect to the structure of available resources, but also with respect to the set of organizations competing for them. Thus, to be formally able to fulfill the requirements for acquiring resources was one thing for the institutes; to hold their own against competing research institutions was quite another. The unification combined two formerly separated populations of organizations: extrauniversity research laboratories in East and West Germany, now both vying for public funds.[24] The restructuring according to the recommendations of the Science Council, however, virtually affected only the Eastern subpopulation. Consequently, the situation was particularly troublesome for East German groups pursuing kinds of research which were also being worked on by established West German institutions. On the other hand, groups that filled gaps within the Western research system (i.e. research topics that were considered promising by the relevant actors, but not covered by West German institutions) found an easier way into the research system of unified Germany. Thus, different degrees of trouble were related to different research topics.[25]

All in all, the preceding section has demonstrated that the amplitude of the environmental variation the institutes had to cope with was extraordinarily high. It even seems appropriate to refer not to an environmental *variation*, but to the sudden *replacement* of one environment by a completely different one.

### 2.2.2 *Internal Trouble*

The capacity of the institutes to cope with the troublesome change of their environment depended – among other things – on the situation within these research organizations. In this sense, one can speak of "internal" trouble, or

24 The German federal system does provide, however, for a partial regionalization of available research funds. The funds for extrauniversity research come not only from the federal government, but also from the *Länder* (see Hohn/ Schimank 1990 for a detailed description of the system). Thus, not *all* the research institutions in Germany compete for a piece of the *same* pie.

25 The branches of the humanities most deeply involved in Marxist-Leninist ideology were, of course, in the biggest trouble. This aspect of the problem cannot be treated here.

of the "specific trouble situation" of the single institutes. As described above, from 1989 on, the institutes of the AdW underwent a period of internal transformation. Hannan and Freeman (1984: 159) make a clear prediction regarding the effect of such a transformation on an organization's chance of survival: "Attempts at reorganization increase death rates. Organizations undergoing structural transformation are highly vulnerable to environmental shocks." According to Hannan and Freeman, this is due to the fact that reorganization processes make organizational action unstable and impair "quality and timeliness of collective action" (ibid.).

Research on the stated correlation between transformation and failure, however, has not yielded unequivocal results.[26] And in the case of the institutes of the AdW, a specific dilemma appears: On the one hand, internal stability probably made it easier to cope with the crisis. For instance, it was problematic to vote out a director because of his ideological activities if he was the only member of the scientific staff with experience in managing an institute, or the only one who had good relations to researchers in the West (cf. Raible 1991). A long-lasting period of controversies over political issues or structural reorganization implied the risk of making the subunits of an institute drift apart, thus impairing its capacity for purposeful collective action. On the other hand, the institutes depended on the public acceptance of their legitimation. A positive judgment by the Science Council was hardly conceivable if an institute did not perform a minimum of democratic reforms. Thus, the institutes were forced to walk a tightrope between organizational stability and necessary reforms. In fact, with regard to this decision, the institutes followed a variety of paths.

Since each institute had a history of its own which could not simply be erased, the institutes' starting positions varied considerably. Though the Science Council concentrated on the evaluation of the potential for *future* research available in an institute, it did not discount history when it decided on the preservation or dissolution of a laboratory. The shadow of an institute's past was often an important part of the trouble it now had to cope with. For

26 See Baum/ Oliver (1991) for a discussion. Haveman (1992: 49) posits in her study of the Californian savings and loan industry that organizational change may prove beneficial particularly in situations of "dramatic environmental shifts that threaten the organizational form with extinction ... ."

example, some institutes were handicapped in the evaluation procedure because their leading members, having been very active within the political system of the GDR, had pushed the research program of their institute into a direction which fulfilled economic requirements of the GDR, but which did not prove to be promising in terms of scientific progress.

Up to this point, the trouble for the institutes has been referred to as "internal trouble," although, from the perspective of the individual researchers, this was still "external trouble." What troubled an institute did not necessarily trouble its employees, and vice versa. A scientist did not have to care about the difficult situation his institute was in if an attractive exit option was available to him. Conversely, the chance of survival of an institute declined if too many qualified researchers turned their backs on it. Thus, the internal trouble situation of an institute resulted from a permanent interplay of individual and collective decisions; in some cases, the coping behavior of one level created trouble for the other level.

The preceding sections have demonstrated that the incorporation of East Germany into the West German institutional system represented a case of extreme external trouble to the institutes and to their members, a complete exchange of the organizational environment relevant to them. Since most of the institutes were undergoing critical intraorganizational transitions at the same time, the external trouble was often aggravated by internal trouble. In the following sections I will discuss the scope of action left to the institutes faced with this troublesome situation.

## 3 Coping with a Steamroller?

The concept of "Coping with Trouble" can only be of analytical value in examining situations in which the affected actors can be assumed to have at least a minimum of coping opportunities. Otherwise, it seems more adequate to speak of an environmental "catastrophe," to which the notion of "coping" cannot apply: People suffer through catastrophes, rather than deliberately coping with them.

Clearly, the transformation process considered here was perceived as this kind of catastrophe by quite a number of observers. One metaphor frequently used to describe the process illustrates this perception: "bulldozing" (in Ger-

man: *plattmachen*, cf.: Etzold 1990; Peche 1990; Weber 1991). For Maier (1991), the East German research system was run over by a "merciless steamroller" steered by West German drivers.[27] According to this point of view, East Germany's research system underwent a procedure of evaluation and restructuring completely under external control. In the following two subsections I will try to demonstrate that this view overly simplifies matters and that at least some of the institutes did have a chance to cope with their trouble, instead of simply having to suffer it.

## 3.1 Perception of the Trouble Situation and Hypothetical Coping Opportunities

The first question to be answered is how the actors within the institutes perceived their own coping opportunities. In interviews with former employees of 12 institutes of the AdW,[28] I asked if, at the beginning of the evaluation phase, they had thought there was a significant scope of action for them. Without exception they affirmed that they had; they had believed that their own actions would have an impact on the final outcome of the process. In retrospect (more than one year later), roughly 50% of the interview partners saw things differently. Looking back, they could not recognize any opportunity for their institutes to influence their organizational fate.[29] Regardless of

27 Translation by the author; the English word is employed in the context of German unification by Dickman 1990.

28 The sample cannot be representative for the whole academy, since I did not take account of institutes in the social sciences.

29 Probably this result can be partly explained by mechanisms of "cognitive dissonance" (Festinger 1957). Strikingly, most of the institutes to which those interview partners belonged who, in retrospect, did not see any scope of action had emerged from the transformation in relatively bad shape. In contrast, most of the institutes whose members said they were able to influence the process had performed rather successfully. It seems reasonable to assume that in the former case the interviewees had a psychological need to blame the circumstances for the unwelcome outcome, while in the latter there was no reason for them to shift away the responsibility for the positive outcome (Kaufman, 1991: 69, describes exactly this mechanism). However, this potential distortion does not affect the crucial point that during the evaluation the members of the institutes assumed some coping opportunities were available.

that change of opinion, this result indicates that during the evaluation period the institutes as corporate actors perceived the situation as being trouble rather than a catastrophe. It also supports the assumption that they tried to make use of their coping opportunities.

Additional support for the assumption that a certain scope of action was available to the institutes can be drawn from statements made by experts involved in conducting the Science Council's evaluation (interviews dhw012193; dhw011493; dhw100692; dhw050393; Gabriel, cited in: *Physikalische Blätter* 1991). In particular, they stressed that the institutes' proposals regarding their institutional future were important, and that a sound proposal was likely to have a positive impact on the judgment of the evaluation committee.

Starting from the assumption of a certain range of action opportunities on the part of the institutes, the next question is: What hypothetical types of action can be thought of? Three types of coping strategies will be proposed.

Firstly, the institutes could try to improve their position by means of *networking*.[30] Their transformation took place within a network of various actors; it was socially embedded (Granovetter 1985). Thus, what the institutes had to do was arrange their external relations in a way favorable to the evaluation process. They had to find supporters among the relevant actors in their environment.[31] The latter included corporate as well as individual actors. On the one hand, since the crucial decision on the future of the institutes was taken by the expert groups and the Evaluation Committee of the Science Council, a process of "peer review" was central to the decision-making process. One important measure, therefore, was to acquire support from influential scientific peers within or outside the Science Council, or to reinforce such support if it already existed. On the other hand, the decision was also heavily influenced by corporate actors. Each big West German research organization and each authority on the federal or *Länder* level which took part in the evaluation followed its own strategy. Thus, an institute or research group not only needed a positive scientific evaluation, but also depended on sufficient support

30 The notion of *networking* refers here to the actor's efforts to find support within existing networks; the systematic *construction* of a network by the focal actor is not necessarily implied here (cf. also Musselin/ Vilkas in this volume).

31 Baum and Oliver (1991) have demonstrated that institutional linkages significantly decrease the likelihood of organizational mortality.

among these corporate actors. Hence, it was well advised to try to get in close contact with these organizations, too.[32]

Secondly, the institutes could try to employ the strategy of deliberate *niche selection*. Within certain limits, the transformation process offered them the chance to select the type of environment in which they would operate.[33] To achieve this, they had to scan the emerging "research landscape" in their discipline for research topics which seemed promising but were not being worked on by too many competing research groups – they had to find a research niche with sufficient available resources. Of course, this also had to be a research program the institute could credibly claim to be able to conduct with some success. The institutes which were not forced to change their research orientation to fill a gap in the emerging research landscape were in the best position.[34] For the other institutes, there was a limit to the extent of reorientation they could realistically perform.[35]

Thirdly, the institutes could engage in *impression management*.[36] Irrespective of their actual scientific quality or of the actual public demand for their work, they could try to represent both as positively as possible. Among the possibilities for the intentional use of impression management were the careful formulation of the answers to the Science Council's questionnaire and the thorough preparation for the expert group's on-site inspection of the Science Council.

Clearly, with regard to all these strategic opportunities, strong limitations applied. In order to build up social support, the researchers had to possess

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32 This was complicated by the fact that the administrations of the East German *Länder* were just being established in autumn 1990. For quite some time, reunified Berlin was the only *Land* possessing a functioning R&D administration.

33 For this mechanism of purposeful niche selection see, for instance, Child (1972); Hage (1977); Sharfman/ Dean (1991).

34 The positive development of the institute specialized on research on the Sorb ethnic minority may illustrate this; it was the only institute in the humanities which was to be converted into a successor institute. Another example is the institute for research on vertebrate animals linked with the East Berlin zoo.

35 See Case Study 3 for an illustration of this problem; with regard to a different type of trouble, see also Gläser et al. in this volume.

36 See Goffman (1987: 207-222); Schlenker (1980); Chatman/ Bell/ Staw (1986) for more information about this concept. Schlenker (1980: 6) defines it as "the conscious or unconscious attempt to control images that are projected in real or imagined social interactions."

sufficient information about central actors and their relations. The ability to gain such knowledge by travelling to capitalist countries had been reserved to a small subgroup (the so-called *Reisekader*) before the borders had opened up. On the other hand, in spite of the high pace of the transformation process, roughly six months remained in which the institutes could improve their relations to other actors. Thus, even the scientists once classified as politically "unreliable" and excluded from trips to the West now had the opportunity to make up for lost time: They had a chance to act.

The same information problem existed with respect to the other strategies described above. An extensive amount of information about the relevant environment was necessary to define a research program and an organizational form promising sufficient resource flows in the future. Successful impression management required sufficient information about the criteria and motives that guided the evaluation procedure. But again I want to state that the transformation process lasted long enough to allow for learning processes. As will be shown below (particularly in Case Study 2), the evaluation was not a one-shot situation, but an iterative process with actions and reactions on the part of both the evaluators and the evaluated laboratories.

As I mentioned above, the institutes of the AdW started from very different positions. Each of them had a different past and found itself in a different internal state. What seems particularly important is that the institutes also differed with regard to the extent of their recognition outside of the GDR. Some of them were already acknowledged as part of the international scientific community before the revolution, while many others were quite isolated from it. Thompson (1967: 33) stresses the importance of *prestige* as a means for organizations to acquire the necessary support from the environment (and to reduce dependence on environmental elements). Of course, the prestige of a scientific institution crucially depends on the prestige of its leading scientists. Thus, it could be considered an important advantage in the transformation of an institute of the AdW if it had one or several outstanding scientists among its personnel.

This leads back to the question of different actor levels. To simplify matters in the discussion of hypothetical action opportunities above, I only dealt with institutes as actors. Nevertheless, while these strategies are conceivable elements of the *corporate* action of the institutes, they were always carried out by *individual* actors. The impression an expert group acquired from its inspection of an institute was composed of numerous single impressions from

discussions with the individual researchers.[37] Similarly, the strategies of niche selection and networking were available to individual researchers as well as to research groups and institutes. Thus, the organizational fate of an institute depended on the interplay of these different levels.

As this section has shown, it is indispensable to study the particular cases of single institutes if one aims at identifying their coping opportunities. Before doing so in the following section, I would like to add a last remark concerning the different actor levels. One might assume that the organizational levels above the institutes played an important part in the transformation process, but this was not the case. Rather, these actor levels had only marginal impact on the fate of the institutes.

The Presidium of the AdW did make its "fruitless coping efforts" (see Mayntz in this volume), trying to find a suitable niche for the academy as a whole. However, since the major goal of the Presidium was to preserve the community of institutes in toto, it did not concentrate on the task of integrating the single laboratories into the research landscape of unified Germany. Moreover, it took the top level of the academy a long time to cope with its own democratization and reorganization. Thus, when the institutes faced the difficult task of coping with the trouble of unification, they did not receive much help from the top level of the academy.

A somewhat more active part was played by the *Forschungsgemeinschaft*[38] and the management of the research departments. From May 1990 on, the board of the *Forschungsgemeinschaft* discussed concepts for the future of some institutes, particularly proposals for Big Science Centers at the major research sites. It also initiated a self-evaluation of the institutes (completed by June 1990), including the formulation of proposals regarding their future as research institutes.[39] However, these activities had only limited impact on the final outcome of the transformation process.

The research departments of the AdW served as a forum for discussing the future of the institutes. However, the activities of the various disciplines

37 The expert groups of the Science Council usually attached great importance to individual conversations with the scientific personnel at all levels, not just with the leading figures (cf. Raible 1991).

38 The *Forschungsgemeinschaft* was the association of the research laboratories of the AdW founded after the revolution (see Mayntz in this volume).

39 This evaluation is documented in a volume containing self-portrayals and conceptual considerations of all the institutes (AdW 1990).

seem to have differed considerably. As a former employee of one research department reported (interview dhw031293), the department of mathematics and informatics very soon gave up all efforts to coordinate the activities of its institutes, while the physics department managed to keep up regular meetings of the directors of the institutes until September 1990.

Thus, while the institutes within some disciplines received limited support from the management of their research department, in general the institutes were left to their own devices. Finally, with the date of the unification, the upper levels of the AdW (except the society of scholars) were dissolved. From then on, even the hypothetical opportunity of support and coordination from above was dropped – but the evaluation was still in process. Virtually all my interview partners from the institutes stated that during the crucial phase of the restructuring they did not obtain any support worth mentioning from the higher levels of the AdW.

## 3.2 Different Organizational Fates – Three Case Studies

As I argued above, the starting positions and the environmental constraints differed considerably among the institutes. I will try to illustrate this point and describe actual coping activities by examining three institutes devoted to the natural sciences.[40]

### *3.2.1 Case Study 1: A Comparatively Unproblematic Transformation*

Institute 1 was a chemical research laboratory founded in 1949. It was one of the traditional institutes of the academy, with 40 years of research experience in a subfield of organic chemistry and physics. With approximately 400 employees, it was medium-sized compared to other institutes of the AdW; according to a member of the expert evaluation group, it was not as heterogeneous as the largest institutes. Its research tended to be application-oriented,

40 The actual names of these institutes are not relevant to the purpose of this article. The information contained in this section stems from published and unpublished documents and from interviews with members of the institutes and external actors (Science Council, agencies at the federal and *Länder* level). To preserve the respondents' anonymity, no reference to single interviews will be given.

with about 50% of the research capacity being linked to industrial clients. Nevertheless, Institute 1 had also acquired a considerable reputation in certain fields of basic research. In one of its principal research topics it even possessed expertise which – as members of the expert group stated – was hardly available in the Federal Republic. During most of its 40 years, Institute 1 was led by highly reputable scientists. Thus, it had also acquired a certain degree of renown in Western countries.

For all these reasons, one can assume that the "trouble situation" for Institute 1 was relatively moderate from the very beginning. However, its organizational past did include some more problematic points. In the second half of the 1980s, political pressure on the institute increased. The appointment of the scientist who directed the institute from 1985 until 1990 was exclusively politically motivated,[41] as were the appointments of other leading scientists and administrators.

As soon as the opportunity arose after the political changes in 1989, however, members of Institute 1 began to redress the results of that politicization. Already in November, a committee was founded and charged with exploring the appointment policy within the institute during the preceding ten years. A senior scientist who had directed the institute for more than ten years until the early 1980s was nominated as chairman of this committee. He had an excellent professional reputation and quite a number of international contacts, including many in Western countries. As he himself stated, these contacts had led to conflicts with his superiors, who succeeded in forcing him to retire in 1985.

In December 1989 votes of confidence were held in the institute. No members of the directorate were confirmed; they all had to resign from their posts. In a democratic election, a scientific council *(Wissenschaftlicher Rat)* was nominated. The senior scientist mentioned above was elected its chairman; shortly thereafter, he was appointed to be the new director of the institute. In February 1990, he was confirmed as acting director by the Presidium of the AdW. By spring of 1990, most of the other managerial positions were newly filled.

41 At least this was the judgment of a member of the expert group, who claimed quite drastically that the appointed director did not know anything about the research topic of the institute.

Thus, Institute 1 managed to complete its internal reorganization in a comparatively short time. While this could not be achieved without intra-organizational conflicts, they were not as severe as those in other institutes; centrifugal tendencies and egoistic policies of different research groups remained within limits. This rendered the institute capable of organized action at a time when many other institutes were still struggling with internal trouble.

It seems that the reinstatement of the former director was particularly helpful for the further development of the institute. He combined scientific eminence with a reputation for having been "persona non grata" in the eyes of the old political system. As members of the expert group stressed, the advantageous effect of such a personality supporting an institute should not be underestimated. It is very likely to enhance an organization's prestige – thus the choice of the new (and former) director can be considered an element of Institute 1's successful impression management. Moreover, since the institute was able to profit from the director's experience and established relations to West German actors, it had an advantage in niche selection and networking, too.

In February 1990, several working teams began to develop the future scientific strategy of Institute 1. By April, a proposal had been drafted. It is not surprising that the strategy regarding the future organizational form of the institute was not extremely precise at this time. However, the paper included an explicit reference to deficits in West Germany in a subfield of chemistry in which Institute 1 was specialized. Thus it is evident that, although rapid unification was not yet certain at that time, members of the institute recognized the need to find niches within the research landscape of the unified country.

Immediately after the opening of the frontier, Institute 1 began to intensify its contacts with Western actors. Among other things, it invited several of the leading West German chemists working in its field to colloquiums and took part in conferences organized by the East and West German research ministries and by the professional association of chemists. It also launched several joint research projects with West German research institutions. Furthermore, a process of personnel reduction began. Between summer of 1990 and September 1991 the number of employees declined by 25%. Although this was one of the highest decline rates within the chemistry department of the AdW, several affected persons confirmed that the social costs of the cutback had in fact been kept low (by means of early retirement, etc.).

A first important step concerning the organizational future of Institute 1 was taken by the FhG. "Rather spontaneously," as a leading member of the institute said, the FhG made contact with the institute. By July 1990, the FhG and Institute 1 agreed that the integration of parts of the institute into the FhG was conceivable. Institute 1 also tried to get in touch with the MPG, but at that time prospects for a partial takeover of Institute 1 by the MPG did not look as positive. A member of the institute's directorate reported that the MPG took a rather negative stance at first because one of its established institutes in West Germany was specialized in the same field as Institute 1.

Roughly, this was the state of affairs when the institute was asked by the Science Council to respond to its questionnaire. It is evident from that response that the institute's plans regarding its future organizational form still remained rather indefinite. Like 30% of the total population of institutes, Institute 1's most preferred option was continuation within a *Forschungsgemeinschaft* of the AdW. *In retrospect,* this option seems as difficult to implement as the second option the institute specified, namely its conversion as a whole into a research laboratory of the *Land* in which it was located. On the other hand, the institute gave as a third alternative its disintegration.[42] It reported the FhG's interest in taking over about a quarter of its employees. Institute 1 also reported another plan for a large share of its personnel: becoming a Max Planck institute. It stated that this plan was to be worked out in September in cooperation with the Max Planck institute in West Germany specialized in the same field.

This coordination actually took place. In the late summer of 1990, a first draft of a proposal for a new Max Planck institute was composed.[43] The proposal explicitly conceptualized the new institute as a complement to the West German one, with a different research orientation than had originally been suggested in April. Thus, Institute 1 received active support in the process of niche selection (support that came from a potential competitor for resources!). At the same time, the plans of the FhG became more definite; now an autonomous institute plus a small branch of a West German Fraunhofer institute were planned. Moreover, a West German Big Science Center

42 Obviously, Institute 1 doubted its ability to survive as an organizational unit.

43 Though research groups from other institutes took part in this process, the most prominent role was played by the director of Institute 1 in cooperation with the director of the West German Max Planck institute.

also expressed its interest in taking over a part of Institute 1. Different organizational solutions had begun to emerge for the individual research groups.

Thus, by the time the expert group of the Science Council visited the institute in December, the prospects of the institute had changed considerably. I consider it an important advantage for the institute that various feasible solutions were on the table at the time of the on-site inspection. On the one hand, this made the task of the evaluators easier. They were not forced to spend too much energy on thinking about practicable institutional options, but met quite a number of scientists whose future was already traced out. On the other hand, the promising state of affairs had a positive effect on the self-esteem of the scientists being evaluated.[44] One can assume that the task of impression management was easier to fulfill under these circumstances.

Members of the institute stated they were satisfied with the course of the inspection. Half a year went by before the Science Council finally decided on its recommendations with regard to the chemical research institutes. During that time period, a kind of "interplay"[45] between the expert group (particularly its chairman) and Institute 1 took place. The proposals for the successor organizations became more and more substantial. The FhG and the Big Science Center made binding positive decisions regarding the respective take-overs even before the Science Council gave its recommendation. Shortly before the final debate in the Science Council, Institute 1 submitted an additional proposal for a small research institute financed by the *Land* (the chairman of the expert group had even encouraged the institute to do so).

In its recommendation, the Science Council supported this proposal along with those for a Max Planck institute, the two laboratories of the FhG and the branch of the Big Science Center. As a result of the recommendation, not a single employee of Institute 1 had to be dismissed into unemployment (with the exception of a few persons who left the institute because of earlier political involvement).[46]

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44 This was pointed out by members of the expert group. It seems conceivable that positive or negative judgments by the Science Council or other scientific peers in the course of the evaluation created positive or negative feedback loops, mutually amplifying external judgment and internal self-esteem.

45 This was stated by a member of the institute.

46 This was confirmed by a leading member of the institute.

The implementation of the recommendations was not altogether smooth. The MPG did not make the official decision to found the new institute until late November 1991 (shortly before the end of the "moratorium"). The research laboratory of the *Land* government has not come into being because of resistance from the *Land*'s ministry of finance. By and large, however, the outcome of the transformation of Institute 1 can be considered very positive. The goal of organizational survival was not achieved for the institute as a whole, but to a high degree on the level of its subunits. Moreover, the interest of a high share of the individual employees in securing their future regular income was satisfied. Finally, as a member of the institute assured me, the most important research fields can also be continued in the new institutions. All in all, the case of Institute 1 can be classified as an example of successful coping. The strategies of impression management, niche selection and networking were aptly pursued by the institute.

### 3.2.2 *Case Study 2: A More Problematic Case with a – Comparatively – Happy Ending*

Institute 2 was founded in the early 1980s as a part of the East German program for the promotion of microelectronics research. Similar in size to Institute 1, it was highly application-oriented, comparable to some extent to an industrial research laboratory. For a time, basic research only made up 15% of its activities. Two thirds of its employees were technical and clerical staff (thus, Institute 2 was one of the institutes of the AdW with the lowest share of scientists). Most of its research was performed in close cooperation with a local semiconductor manufacturer. Due to the high economic priority placed on microelectronics, Institute 2 received comparatively large subsidies from the state; its investment funds were extraordinarily large. On the other hand, it was rather secluded from international research in the discipline. As the institute conceded in its self-portrait for the *Forschungsgemeinschaft*, it was mainly working to reproduce the international R&D standard.[47] However, it pointed to a few original research contributions acknowledged by the international scientific community, including a biennial international conference on problems of semiconductor technology it organized from 1985 on.

47 The insufficient participation of the physics research institutes of the AdW in international research (with some exceptions) is admitted in AdW (1990: 20).

Since its founding, Institute 2 had been directed by the same professor, who, according to one of the institute's leading scientists, did not have much of an international reputation and lacked contacts outside the GDR. Evidently, it was the other scientists who were to be credited with managing to establish the international contacts mentioned above. All in all, it can be stated that the "trouble situation" for Institute 2 was more severe than for Institute 1. Institute 2 worked in a subfield in which the isolation of the GDR from the international development was particularly disadvantageous and the competition among R&D institutions particularly strong. The institute was not able to build on widely uncontested prestige within the scientific community.

Moreover, the internal situation of Institute 2 was rather problematic. Much more than Institute 1, Institute 2 was divided into subgroups with conflicting interests. The necessary process of reorganization was hindered by this situation. Several times the director was voted out of office, only to be reappointed soon after. Eventually, he remained in charge until the end of existence of the institute. As one member of the institute put it, the different subgroups maintained a certain loyalty to the director, seeing him as a figurehead who was not, in fact, able to take decisions binding on them. The election of a scientific council did not take place until spring of 1990.

During the first half of 1990, the search for the future scientific and organizational orientation of Institute 2 proceeded rather slowly. A member of the institute reported that in this period the institute possessed little information about the West German research system and could hardly figure out the differences between research organizations like the FhG or MPG. In spite of its low share of basic research, for a short period Institute 2 even thought about going in the direction of becoming a Max Planck institute.

The most serious efforts at that time, however, concerned the FhG. The director of Institute 2 had several talks with the director of a Fraunhofer institute in the same field. At first, the FhG gave hopeful signals as to its willingness to integrate Institute 2, but a definite promise was never made. Nevertheless, the inclusion of Institute 2 into the FhG was described as the institute's aspiration in the academy's report compiled in June 1990 (AdW 1990). Other activities of the institute in that period included the reduction of personnel by separating out several subunits involved in the manufacturing of equipment and putting them into private ownership.

According to one of its members, Institute 2 did not prepare very carefully and systematically for the evaluation by the Science Council. The response

to the questionnaire was compiled and written mainly by an employee of the institute's administration. The institute's scientific council did not take part in a systematic way, and the director even went on vacation while the report was being prepared. Upon reading Institute 2's response to the questionnaire, members of the physics department of the AdW had the impression that the proposal for future development would not be successful. Not only its content, but also its style and form were criticized. The response did not reach the Science Council until just before the deadline.

Institute 2's statement regarding its future was one of the most indefinite among all the answers submitted to the Science Council. It proposed splitting the institute into three units; this was an indication of the rift between Institute 2's subunits. Two of the suggested laboratories were supposed to cover certain scientific topics, the third one was supposed to become part of a nearby university. Beyond that, the text simply stated that the question of the future status and institutional affiliation of the institute was to be treated separately.

In November 1990, the expert group of the Science Council visited Institute 2. The result of the inspection was ambiguous. On the one hand, the expert group found that the kind of fundamental research the institute had suggested would be impossible due to technical insufficiencies, and that its conflicting subgroups did not "speak a common language" (as a member of the institute put it). Moreover, a member of the expert group heavily criticized the presentation of the institute given by its director. On the other hand, the expert group pointed to the stock of expert knowledge available there. With reference to economic considerations, it concluded that the preservation of this knowledge was desirable, but that a practicable way to achieve this was yet to be found. As one of the experts reported, regional policy was discussed as another reason to preserve Institute 2 (it was the only institute of the AdW in that region). Thus, in spite of the unsolved problems of its future organizational affiliation, the selection of an appropriate research program and the criticism of the available infrastructure, it was evident that the expert group intended to deal with these issues and to grant the institute some support.

After the inspection, the members of Institute 2 perceived their situation rather pessimistically. One member reported that at that time he received information that only a small group of scientists would be able to "survive." Thus, it can be stated that at that point in time the trouble situation of Institute 2 was still quite serious and that its coping strategies were not working very well.

Nevertheless, at about the same time a group of scientists became more actively engaged for the future of Institute 2. From January 1991 on, this group – without the director! – compiled another report which they sent to the Science Council on 17 January. This statement contained a rather self-critical account of the suggestions the institute had made in its first report to the Science Council. It also presented a modified research proposal and new organizational solutions, particularly the foundation of an institute tied to the local university. It reiterated, however, the suggestion to split Institute 2 into three units. On 15 January, the director had sent his own revised report to the Science Council which was less critical and less detailed with regard to the suggested research orientation.

A rift between a passive or even obstructive director and a more active group of scientists within Institute 2 was becoming apparent. The group also began to intensify contacts with scientists and industrial corporations in West Germany and abroad, asking them for their point of view with respect to the future of Institute 2. They received some supportive reactions which they passed on to the BMFT, thus demonstrating that important actors perceived considerable demand for the activities of Institute 2. What seems particularly important is that they got in contact with an outstanding Western scientist (Institute 2 had already cooperated with him before 1989). They offered to recommend him as the founding director of a possible successor institute emerging out of Institute 2. They were able to gain his interest, so that from then on he actively supported the institute in its process of reorientation. Evidently, the strong support of such an eminent member of the community of scientific peers (as an additional expert, he also took part in the evaluation by the Science Council) was very beneficial in the further development.

In February, the same group of scientists sent another report to the Science Council. The proposed research topic was further elaborated upon; the issue of organizational affiliation, however, still remained rather uncertain. The three more recent reports to the Science Council no longer mentioned the FhG. By the end of 1990 at the latest, the FhG had decided not to take over Institute 2 or parts of it (apparently mainly because of the insufficient state of its technical devices and because the FhG already had several laboratories working on similar research topics).

From May on (i.e. in the late phase of the evaluation period[48]), there was important progress in the process of niche selection for Institute 2. It chose a new specialty upon which it would concentrate (a combination of semiconductor materials that was not frequently treated in German laboratories). The Western scientist mentioned above – who, in fact, was later appointed to be the founding director of the successor institute – played a major part in conceiving this research program; he did so, among other things, in talks with the BMFT where he found support for this project. This special research program was not explicitly mentioned in the recommendation of the Science Council. However, its development (about which the Science Council was well informed) very likely had a positive effect on the judgment of the evaluators. According to the opinion of a member of Institute 2, it also partially reduced the thematic similarity and hence competition with laboratories in the West German (and even European) field of microelectronics. Without that reorientation, the Science Council probably would have recommended a much smaller successor institute.

Since spring of 1991, a Blue List institute was the favorite organizational solution for Institute 2. The institute stated its preference for this option in a talk with the chairman of the expert group of the Science Council. Eventually, in the decisive meetings in June and July 1991, the relevant committees of the Science Council opted for founding a Blue List institute based on Institute 2. The proposed institute was to have roughly half as many employees as Institute 2 had at the end of 1991. Since it included a markedly higher percentage of scientists, however, a comparatively large share of scientific employees of Institute 2 was given the opportunity to continue their work. A member of Institute 2 stated that the institute's most important scientists found their way into the newly founded institute. All in all, he ranked his institute as belonging to the most successful third of the physics institutes of the AdW, although he had ranked it as being in the most problematic third during the first phase of transformation.

Although the new institute differs from the old one in size and many other organizational aspects, one can assume the continuance of the original or-

48 Thus, the time factor is obviously very important. While a crucial and beneficial change in the development of Institute 2 (and there are other similar examples) took place, the recommendations for roughly one third of all institutes of the AdW had already been passed.

ganization. The interest of organizational survival, therefore, was preserved, even though the institute did not pursue it during most of the transformation period.[49] However, the interest of the individual employees in continued employment was met to a lower degree than in Institute 1.

Case Study 2 demonstrates that the evaluation process included the chance to revise a temporarily unfavorable course of development. Though Institute 2 did not pursue a very convincing coping strategy in the first phase, it acted more appropriately in the second one, when the means of niche selection and networking were more actively brought to bear. There is evidence that these activities had a positive impact on the decision of the Science Council, and that they contributed to a correction of the ambiguous first impression Institute 2 had made. What seems equally important is that – as had happened in the case of Institute 1 – a beneficial interplay emerged between the Science Council, the evaluated institute, and the government agencies which later promoted the successor laboratory.

### *3.2.3 Case Study 3: A Particularly Problematic Case*

Founded in 1954, Institute 3 was directly subordinate to the Ministry of Heavy Industry until 1970, when it was transferred to the physics department of the AdW; in 1973 it switched to the chemistry department. As a member of the expert group stated, Institute 3 had always been a kind of alien element within the academy. Mainly performing tasks in the science of engineering, it did not fit easily into the pattern of disciplines. Like Institute 2, it was highly application-oriented; it had a high share of non-scientist personnel and a percentage of basic research that did not exceed 30% of its activities. Its tasks were determined to a great extent by requirements typical of the GDR: the institute concentrated on optimizing the exploitation of raw materials available on the East German territory. According to the report the institute submitted to the Science Council, it protested several times – fruitlessly – against the imposition of this kind of task from above during the last years of the GDR. In terms of personnel, Institute 3 was comparable in size to

49 A member of the expert group stated that the proposal of a disintegration made by Institute 2 was the most foolish strategy the institute could pursue. It sacrificed one strong point of the institute, namely the combination of application-oriented activities and basic research.

Institute 1 and 2. Housed in a huge building, it had a great number of technical devices, allowing it to work up large quantities of material. As the institute itself admitted in the report, its level of participation in international research cooperation was relatively low. It was not well known in the international scientific community, nor did it have many contacts to foreign laboratories, especially in the West. This is partly explained by the fact that, many years ago, most Western research institutes discontinued their engagement in the rather traditional kind of research performed by Institute 3.

Because of its tight inclusion into the GDR's policy aimed at national autarky and its lack of prestige as a scientific institution, Institute 3 was faced with severe trouble when the unification process began. The only assets it could be said to possess were the technical facilities and the – mainly technological – expertise of its personnel.

As had been the case in Institute 2, the first period after the revolution in 1989 was marked by serious internal conflicts. Constructive action for internal reforms did not get under way before spring of 1990. In May, confidence votes were held. While the director received support (he retained his position until the winding-up of Institute 3), one of his deputies and roughly half of the heads of the departments and sections were not confirmed. However, not all of them immediately resigned from their positions.

In the first evaluation report for the *Forschungsgemeinschaft* (June 1990), Institute 3 outlined a reorientation of its activities toward environmental research, conceding, however, that since most of these topics would be new territory for the scientists, it would take some time before they could perform this research with optimal efficiency.

The preparation for the evaluation by the Science Council was mainly organized by the established top personnel. The response to the questionnaire makes a rather indeterminate impression. No profound change of the research orientation was intended, except for an intensification of environmental research and a strengthening of basic research. Preference for maintaining the institute – in the form of a Big Science Center – was expressed. In retrospect, this option must seem rather impracticable even to the members of the institute. A leading scientist of Institute 3 admitted that the institute as a whole would not have fitted into the emerging research landscape of unified Germany. A second choice described in the report was splitting the institute into three units, each of which would have a different institutional affiliation. Moreover, plans for separating out parts of the institute and transforming them

into private corporations were presented. Specific steps toward integrating Institute 3 or its subunits into the West German research system had not been taken up to that point.

A shift to a more active reform orientation took place rather late in the transformation process; this, too, is similar to developments at Institute 2. The personnel council and the scientific council of the institute jointly initiated what they called a "fundamental restructuring and reorganization" of the institute at the end of September 1990. Two large research departments – one of which was called "environmental process engineering" – were formed to which the research tasks of the various sections were assigned. In-house applications for the positions of the directors of these departments were requested. When these positions were filled, the newly appointed department heads in turn requested in-house applications for the positions of the directors of all the sections. Compared to what occurred in many of the other institutes of the AdW, this internal reform can be considered quite far-reaching. Only now did the influence of all the former leading members who had not been confirmed in the confidence vote begin to diminish. Thus, similarly to Institute 2, Institute 3 became more active at this time owing to a bottom-up process originating at the level of the rank-and-file personnel. In contrast to Institute 2, however, there was no open conflict with the director. According to a member of the institute, the new organizational structure and the new leading scientists made it possible for the process of reorientation to be pursued more by consent than by conflict.

As of October 1990, Institute 3 began to have talks with organizations that might potentially take over parts of it. Several talks with the FhG bore no fruit in the end. The FhG made clear that Institute 3 would not be among the research groups it would take over, at least in the short term. Institute 3 also got in contact with a local university. For some time, the project of creating a publicly financed institute associated with that university and staffed by personnel from Institute 3 was discussed. Ultimately, however, the university refused to take over Institute 3 as a whole or any large parts of it. However, it signaled its willingness to integrate some small research groups into its chemistry department.

The situation was aggravated by the fact that quite a number of scientists left the institute at that time. Though the decline in personnel did not turn

out to be as large in Institute 3[50] as it was in Institutes 1 and 2, the institute itself complained in a report to the Science Council that the departure of 16 scientists had left a noticeable gap with respect to the fulfillment of future research tasks. As members of the institute reported, an outstanding scientist had already left the GDR before the opening of the border. Some members felt that had he remained, this very scientist could have become director and given the institute a new research profile. So there is some indication that – in comparison to the developments in Institute 1 and 2 – Institute 3 suffered more disadvantageous effects from the interplay between the level of individual scientists and the organizational level. However, interviewees from Institute 3 stressed that, even with the help of the scientists mentioned above, the negative outcome could not have been prevented.

At the end of January 1991, Institute 3 drew up an additional report for the Science Council. The institute stressed that a critical examination of the situation in East Germany had made it clear that a stronger concentration of the institute on environmental research was required and proposed a corresponding research program. Regarding the institute's organizational future, a split-up in various units was now planned. Still, the future affiliation remained rather unclear. Among other things, an institute of the Blue List and a laboratory of the FhG were mentioned. Institute 3 also intensified its efforts to acquire external funds from private or public institutions. However, these activities met with only limited success. In particular, the institute did not succeed in getting significant support from industrial corporations.[51]

The revised report to the Science Council was completed only three days before the inspection date in February; this was one of the last inspections conducted in the AdW.[52] The evaluators were apparently impressed by Institute 3's technical facilities, and after the inspection the outlook within the institute was rather optimistic.

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50 In its first evaluation report for the *Forschungsgemeinschaft*, Institute 3 stressed that a reduction of its R&D personnel was not required.

51 Shortly before the decisive meeting of the Science Council, Institute 3 had to admit that the number of projects for which external partners had granted their support was still too small.

52 Again, one may speculate about the importance of the time factor. Since the inspection of Institute 3 took place very late, the stretch of time remaining up to the final recommendation was comparatively short. Conceivably, this rendered the search for appropriate institutional solutions more difficult.

Actually, the expert group found it necessary to consult additional experts to evaluate the scientific value of Institute 3's research.[53] The four expert opinions submitted were rather negative. The expert group came to the conclusion that the technical devices of Institute 3 were oversized and that there was no perceivable demand for the kind of work it performed. Nevertheless, since Institute 3 was principally considered to be a valuable establishment (mainly because of the technical facilities and expertise available there), the expert group launched some efforts to find suitable solutions for its future.

Between the date of the inspection and the passing of the recommendation in July, Institute 3 started several new initiatives. A small research group joined other institutes of the AdW in drawing up a proposal for a new Max Planck institute – in fact, it was later integrated into this very institute. More importantly, Institute 3 drew up a plan for integrating one of its two departments (with more than 100 employees) into a new Big Science Center for environmental research which was soon to be founded in East Germany.

The expert group, on its part, had worked out a plan in which Institute 3 would become a soil decontamination facility which would be funded by the BMFT or the Federal Ministry for the Environment. In fact, when the recommendation was finally published, this project was the only proposal that included the chance of further support for a significant number of employees of Institute 3, whose dissolution was recommended. Beyond that, the Science Council only expressed its support for the integration of the group mentioned above into the Max Planck institute and of some small research groups into the university. The option of integrating parts of the institute into the new Big Science Center was not even mentioned.[54] What was even worse for Institute 3, the Science Council did not give an unconditional recommendation for the project of an establishment for decontamination. Rather, it formulated this idea as a mere suggestion to the appropriate ministries, pursuing it with much less vigor than the usual, unconditional recommendations.

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53 This relates to the special character of the institute which obviously presented a problem to the expert group.

54 One reason may be that this option was introduced in the second additional report to the Science Council, which was written at the end of June 1991 just two weeks before the decisive meeting of the Science Council. At that point, it was obviously too late to give serious consideration to a project of such significant dimensions.

Thus, things turned out rather negatively for Institute 3 in the end. The establishment for the decontamination of soil has not come into existence (and probably will not). Though there may have been a certain willingness on the part of the BMFT to realize the project (actually, the ministry supports the former institute to a significant degree with project grants), several serious problems surfaced. The existing demand in East Germany for this kind of work had obviously been overestimated; doubts emerged as to the appropriateness of the institute – situated in the midst of a residential district – for treating large amounts of highly toxic material; moreover, there was a discussion as to whether such activities should be financed by public authorities at all or rather be performed by private enterprises. The (former) members of Institute 3 were forced to make the best of their situation, and they were moderately successful. Some groups were able to survive on project grants, others tried to hold their own as business corporations. For many others, receiving funds from the federal labor office's job-creation program (ABM) was the only way to continue their work, at least temporarily. Including the Max Planck and the university groups, approximately half of the former personnel of Institute 3 receive further funding.[55] But most of their positions are highly insecure. Thus, neither the interest of organizational survival could be satisfied, nor could a high share of employees realize their interest in continued employment.

Not surprisingly, members of the institute expressed their strong dissatisfaction with this outcome. Some of them stressed in particular that the Science Council, ignoring the reorientation that had taken place, continued to focus on the first proposal written before the internal reform. They expressed the opinion that all the coping activities of their institute had virtually no impact on its fate. Moreover, most of the interviewees explicitly blamed the evaluators for having pursued some kind of self-interest as competitors for R&D resources. They called the decision to "wind up" their institute a "political" one.

External actors from the Science Council and authorities involved in the institute's evaluation drew a different picture. They described the activities of Institute 3 as being far removed from any conceivable demand once unification had taken place. They criticized the reorientation of the institute toward

55 Thus, individual coping to some extent compensated for the failure of corporate coping (see the similar example described by Schimank in this volume).

environmental research as being an obvious break in its tradition which could not be bridged successfully.

To summarize, in the case of Institute 3 none of the coping efforts sufficed to prevent the negative outcome. Networking did not function well; only a very limited number of external supporters could be won. Impression management apparently worked in only one respect: The expert group was indeed impressed by the technical facilities available in the institute, and this seems to be a major reason why they made an effort to find a suitable solution at all. The endeavor of Institute 3 to find an appropriate niche by redirecting its activities toward environmental research was not successful because it represented a break with the organization's past which was considered to be too abrupt.

## 4 Conclusion

A variety of factors determining the fate of the institutes of the AdW during the process of German unification was described in the preceding sections. All the institutes were equally affected by the *general trouble* of German unification, i.e. by the abrupt change of their general environment described in Section 2. But each of them also found itself in a *specific trouble situation.* The particular organizational history of each institute, its research orientation, its organizational prestige, the dynamics of its personnel's exit decisions, and the particular actor constellation in its scientific field are elements of this specific trouble. Each institute followed its own strategy of *coping* with both kinds of trouble. Three types of strategies were described: niche selection, networking and impression management. General trouble, specific trouble and coping in combination determined the organizational success of the institutes.

As the case studies demonstrated, the elements of trouble *and* coping can be easily found in the development of the single institutes. However, the case studies have also shown how difficult it is to strictly separate specific trouble and coping with respect to their impact on the final outcome. For instance, it seems virtually impossible to determine the extent to which the organizational success of an institute can be attributed to the sophistication of its coping behavior, the moderate amount of trouble it faced, or a combination thereof. Although I tried to delimit the impact of these factors by considering

how they were evaluated by different observers from within and outside the institutes, an exact weighing of these closely interwoven factors is not practicable. Given these reservations, the three cases can be thus summarized:

- The specific trouble situation of Institute 1 was relatively moderate. Among other things, it could capitalize on its experience in a subfield of chemistry which was considered a desideratum in West Germany. Thus, the likelihood that large parts of Institute 1 would survive the trouble of unification was rather high from the start. Nevertheless, Institute 1 also proved to be outstandingly skillful in coping. It can be assumed that the institute was thereby able to increase the share of its personnel which was to receive further promotion.
- Institute 2 found itself in a more severe trouble situation. It worked in a field where the technological lag of the GDR behind the Western industrial nations was particularly disadvantageous. Its problematic internal state also seriously affected its coping efforts. However, rather late in the transformation process, it succeeded in overcoming these difficulties (at least to a certain extent) and started some activities which turned out to be helpful in the end. Perhaps the most important among these activities was that the institute managed to win an outstanding Western scientist as a coalition partner. As in the case of Institute 1, it seems very likely that coping contributed substantially to organizational success.
- Institute 3 had to cope with the most serious specific trouble. Its activities were particularly closely determined by conditions typical of the vanishing GDR. As was the case in Institute 2, it did not display very active coping behavior for a long time. It also became more active in a comparatively late stage of the process. There is some indication that, even then, its coping behavior was not particularly adroit. Among other things, Institute 3 did not finish the two additional reports to the Science Council until just before the inspection and the final meeting respectively. Therefore, it is understandable that the Science Council could not thoroughly analyze these documents. However, it appears plausible that in the case of Institute 3, the trouble of unification was so overwhelming that even the most skillful coping behavior would not have changed the final outcome.

Summing up, how can the transformation of the institutes of the AdW during the unification process be described? Since a certain scope of action on the part of the institutes as well as a certain impact of their coping behavior on

the final outcome could be demonstrated,[56] the notion of "bulldozing" (which equates the process with an ineluctable catastrophe) does not do justice to the process in general. Instead, I want to employ another metaphor: Kaufman (1991: 67) likens the organizational environment to a "perpetually varying net or screen sweeping continuously through the total aggregation of interlocked organizations that form in the human population." Kaufman describes how organizations continuously try to change their shape in order to fit through the holes of the net. And – be it by deliberate planning or by accident – in some cases they actually succeed in fitting themselves through. But there are three other possible cases: Sometimes the shape of the organization and the shape of the holes differ so much that the organization cannot succeed in adapting its form, no matter how undaunted its efforts. Sometimes the holes in the net are so large compared to the organization that the latter will fit through regardless of its adaptation efforts. A fourth case is conceivable: an organization may at first be shaped appropriately to fit through the net, but its very efforts to maintain or improve this fit may lead to the unintended consequence of a shape that no longer matches the holes. Though such fatal maladaptation may have occurred in the transformation of the institutes of the AdW, I do not know of any specific example. However, Institute 1 came very close to pursuing a strategy which probably would have turned out very disadvantageously. In the first months after the revolution in the GDR, members of the institute discussed the possibility of separating out the institute from the AdW and transforming it into a private enterprise. Had it done so, the institute would not have profited from the temporal protection of the "moratorium" and would have faced the very difficult situation of East German private R&D establishments during recent years.

The process of German unification (or: the trouble it produced) can be equated with one pass of the environmental net through the population of East German institutions, among them the institutes of the AdW. The institutes

56 Additional support can be drawn from a poll (Bigl 1991) which was answered by 26 institutes of the natural science department of the AdW (including two institutes of the Academy of Agricultural Research). 55% stated they were justly evaluated by the Science Council, 40% agreed with qualifications, only 5% answered in the negative. 50% reported that the recommendations of the Science Council were mainly based upon their own suggestions; 40% agreed to this with modifications, and only 10% negated this statement. These results indicate that many institutes perceived noticeable impact of their actions on the outcome of the evaluation.

that did not fit through the holes of the net have been swept away, the others "survived." True, Kaufman (1991: 80) points to the limits of this metaphor: "I do not mean to portray organizations and their environment as separate, independent forces, one active and the other passive." According to his approach, "the properties of organizations themselves are important determinants of the environment and of adjustments to it." In the case considered here, these limits are obvious. The institutes of the AdW were not compelled to adapt to identical holes; the character of the net (i.e. the gravity of the environmental change) varied from one institute to the next. This is what I referred to as specific trouble: The net had holes of different shapes and sizes at different positions.

For some of the institutes, the holes in the net at their particular position were so large that they would have fitted through them in any case, regardless of their own actions. Institute 1 can be placed in this category.[57] Some other institutes – like Institute 3 – were shaped so differently from the holes that they would have been swept away by the environmental change no matter what they did. In a third group of institutes – among them Institute 2 – the difference between the shape of the organization and the shape of the hole was so small that it could be made up for by the coping behavior of the institute. Only in this subgroup was coping essential for organizational survival.

Since the case studies have demonstrated how difficult it is to evaluate the impact of the different factors on the final outcome, it does not seem practicable to distribute the 60 institutes of the AdW among these three categories. Nevertheless, it can be stated that a significant number of institutes falls in the second group, in which coping made a difference. This holds true all the more if we depart from the binary distinction between organizational survival and death, which was adopted above from ecological organization theory, and take into account the gradual changes successful coping could achieve (for instance an increase in the share of personnel which was to be integrated into successor organizations).

All in all, the "Coping with Trouble" approach can be useful in the particular case considered here, but it must be employed in a differentiating way. *All* the institutes were in trouble, and *all* of them coped with it in some way, but since their specific trouble varied to a high degree, coping behavior mat-

57 At least if we disregard the potential maladaptation described above.

tered significantly only for a subgroup of them with respect to their organizational fate.

If all that is true, however, the result of this article appears rather promising for the concept of "Coping with Trouble." After all, the discussion in Section 2 stressed the singular and particularly far-reaching character of the trouble of German unification from the perspective of the institutes of the AdW. If effective coping strategies can be discerned in such an exceptional trouble situation, this analytical concept must be all the more useful in more common situations of "normal trouble." Thus, further investigation in this direction seems worthwhile.

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