Chapter 5
Medialization of Science as a Prerequisite of Its Legitimization and Political Relevance[1]

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Abstract Sociologists have diagnosed an increasing 'medialization' of science—that is, an orientation towards the mass media, with the consequence that media criteria become relevant within science. The medialization of science is seen in this chapter as a consequence of the medialization of politics. Based on empirical surveys of German researchers, public information officers of science organizations and decision-makers in the political-administrative system, as well as a hermeneutical analysis of German press coverage, the authors analyse the manifestations and political impacts of medialization in the public communication of scientists and science organizations. Two biomedical fields—stem cell research and epidemiology—are used as case studies. Results of the empirical analyses support the hypothesis that the medialization of

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This chapter was originally published in German in Renate Mayntz, Friedhelm Neidhardt, Peter Weingart and Ulrich Wengenroth (Eds.), *Wissensproduktion und Wissenstransfer—Wissen im Spannungsfeld von Wissenschaft, Politik und Öffentlichkeit*, transcript Verlag, Bielefeld, 2008. We thank transcript Verlag for its generous approval of this translation and permission to reprint it in this volume.

D. Cheng et al. (eds.) *Communicating Science in Social Contexts*,

science, in so far as it guides the public communication strategies of scientific actors, increases the chances of scientific actors being noticed and taken seriously by the political-administrative system. Effects are seen in a contribution to the legitimization of science by reinforcing the perception of its social relevance and in improving the chances of scientific expertise becoming effective in policy-making.

Keywords Legitimization, media constructs of science, media contacts of scientists, medialization, political impact of science coverage, public relations of science

5.1 Introduction

The medialization of politics is regarded as one of the central changes in the political process in the modern 'media society' (Schulz 2006, Vowe 2006). A number of related developments can be understood in this context: the prevalence of media-constructed reality, the key importance of media in conveying political ideas to voters, and the orientation of political communication actors to the 'logic' of the media (Sarcinelli 1998). To begin with, medialization has consequences for the manner in which politics are presented. The political output is addressed primarily to the mass media and the central criterion for success is a positive response in media coverage. The question, however, is whether the changes brought about by medialization are limited exclusively to the way politics are depicted, or whether they also affect content. From the outset of the discussion concerning the consequences of the growing media orientation of political actors and voters, fears have been voiced that we could be moving towards a world of media-induced appearances and the dominance of symbolic politics. In short, this would be a situation in which medialization affects the substance of politics, decreasing the quality of political work (Sarcinelli 1989, Kepplinger 2002).

Imhof (2006: 201 ff) has identified, as a consequence of medialization, an increasing concentration of power in actors that use public relations (PR) strategies to affect the political arena. He links the success of media-response oriented non-governmental organizations (NGOs) to their early adaptation to the conditions of the media society. Meanwhile, however, established actors have compensated for the initial advantage gained by NGOs in terms of media response 'by adapting a successful newsworthiness-oriented manner to the media's logic in the selection, interpretation and "staging" of events'.

Weingart (2001) looks at medialization with respect to science. He sees, as a consequence of this phenomenon, an increase in the orientation of science to the media, which is due to the increasingly close connection of science to its social context. According to Weingart, in concrete terms, this is done in order to increase the legitimacy of science and influence political decisions (e.g. to support large-scale research), as well as to rally public support for claims in intrascientific disputes (e.g. disagreements about priorities).

As in the case of politics, the question arises here of whether medialization merely influences the public presentation of science and scientific knowledge, or also has repercussions on research and the knowledge it produces. The latter case would imply limitations on the autonomy of science and—also analogous to the discussion of political medialization—may threaten scientific quality. Weingart (2001: 249) makes the assumption that, in addition to the strengthening and professionalization of science PR based on corporate models, there are also influences on decisions in the research process and on the 'core of knowledge production'.

According to Imhof's thesis, as the medialization of politics increases, there is also increased pressure on institutions that are dependent on politics to follow suit with their own medialization; those institutions use the media to reach their addressees within the political system more effectively and to hold their attention. In this way, the parallel medialization of different parts of society—such as politics and science—creates a new, indirect link between those areas through their orientation to the media.

Thus, this is the central thesis of this chapter: the medialization of politics compels the medialization of science as a precondition of, first, its legitimization and, second, the political effectiveness of scientific expertise. Phenomena indicating adaptation to the expectations of the media will be shown to exist in the interface between science and the media and, as a result, this media orientation offers an opportunity for science to influence politics.

In the 'Integration of scientific expertise into media-based public discourses' (INWEDIS) project, some of the phenomena that we expected to find according to our thesis were examined more closely, using the biomedical fields of stem cell research and epidemiology as examples: first, the adaptation of science to the requirements of media communication on the part of science organizations and scientists; second, the media construct of science (especially those aspects concerning the legitimacy of scientific claims to validity as a basis for political regulation); and third, the paths of media influence that science may potentially give access to the political process. To this end, some 400 German stem cell researchers and epidemiologists were surveyed by mail, 20 interviews with heads of PR departments of scientific institutions were conducted, 240 newspaper articles about stem cell research and epidemiology were analysed hermeneutically, and some 40 representatives of the political-administrative system were interviewed.[2]

Because of their relevance to public health, the biomedical research fields of epidemiology and stem cell research both receive high levels of media attention and, for different reasons, have political relevance. While epidemiological knowledge forms the basis or legitimization for political regulation, the issue in stem cell research—in so far as stem cells from human embryos are used—is the political regulation of research itself. On the one hand, stem cell research has come into conflict with social

[2] The surveys of both the scientists and the PR heads were carried out using international comparisons; however, for reasons of space, this article deals only with the results obtained in Germany. The survey methodology is documented thoroughly in the final report for the project, which is available online at http://hdl.handle.net/2128/2887.

values (protection of embryos); on the other hand, it is considered to be an important research field in which Germany cannot be permitted to lose its place among world leaders in the technology.

In the hermeneutic media analysis, we can see the crisis in the relationship between science and its social context in the case of stem cell research, and the difference between that research and epidemiology, which is an example of an unproblematic normal case of the science–society relationship. However, this difference is rarely visible in the PR survey, the decision-maker interviews or the scientist survey. In our assessment, this can be attributed to the fact that the 'crisis situation' is limited to a very specific research area. It is no longer noticeable as soon as empirical findings reconstruct the dominant pattern of media relationships (as is the case in the PR and decision-maker questionnaire) or the scientific community of stem cell researchers (only a very small part of which is composed of researchers working with human embryonic stem cells) is surveyed as a whole.

5.2 Adaptation of Science to Media Communication

5.2.1 Media Logic: Selection, Recontextualization and Framing

The media (or journalism, to which we limit ourselves in the following discussion) construct reality according to specific rules. Traditionally, those rules are described using the concept of 'news factors', which presumably guide journalistic selection. According to this concept, events mentioned in media reports are selected on the basis of, for example, geographical, political and cultural proximity; surprise; relatedness to a topic that has already been introduced; prominence; personalization; conflict; success; or damage (as seen in Schulz 1976, for instance).

The concept of news factors is useful as a heuristic description of the attention-criteria of journalism. But one has to agree with Imhof (2006: 204) that any description of media communication based solely on the 'gate keeper' model of selection criteria misses the mark with respect to the media construction of reality. However, news factors can also be interpreted in an extended sense as rules of construction—the rules according to which journalistic representations create relevance for the public, in which appropriate contexts are created or emphasized. But even in this broadened interpretation of news factors, central processes of journalistic meaning-construction escape from view. Those processes are discussed using the terms 'recontextualization' and 'framing' (see, for example, Knorr Cetina 1981 and Dahinden 2006). These concepts imply that events take on different meanings depending on the context and on the specification of the general meaning structure of which they are presented as an instance (Gamson and Modigliani 1989).

In Kohring's (2005) variety of system-theoretical media theory, science journalism is conceptualized as an observation of science according to rules that are different from those of the system being observed. For Kohring, journalism is a socially differentiated capacity for observation from which the binding character

of media constructs results (for example, for politics). The decisive rule of selection according to Kohring is multi-system relevance. In other words, scientific events selected for news coverage are those that are deemed likely to generate a response in the social context of science, such as those considered to have medical, political, legal, economic or moral implications.

One of the consequences of this conceptualization of journalism is that journalism is seen not as a transmitter of knowledge but as a producer of knowledge. Observation of society results in media constructs, which represent a specific type of knowledge about the world that is influenced by the media logic. However, journalistic 'observation' is based on interaction with actors that have authentic access to the observed system. In concrete terms, what this means is that journalists interview scientists and provoke responses that would not have occurred in the absence of the journalistic enquiry, and that journalists refer to PR materials that are targeted for use by the media.

5.2.2 Institutionalization of Media Contacts as an Element of Leadership Roles

In its observation of the science system, science journalism is highly dependent on scientists and organizational science PR. For this reason, scientists and science PR take part in the creation of media constructs, just like journalistic information sources in other fields. Of course, they are by no means objective informants; rather, they allow their interests and goals to influence their self-representation as well as their portrayal of particular problems (such as the risks of smoking, in the case of epidemiology). Both on the organizational level and on the level of the individual scientists in both research fields, a high degree of media-related communication activity can be observed. Each year, PR offices in German universities and research centres commonly issue several hundred press releases and respond to hundreds of journalistic enquiries.

More than two-thirds of the German stem cell researchers and epidemiologists surveyed had contact with journalists within the past three years (Table 5.1), mostly through interviews. About one-third of the scientists can be said to have had more

Table 5.1 Frequency of Media Contact in the Past Three Years

	All (%)	Stem Cell Researchers (%)	Epidemiologists (%)
No contact	30	34	22
1–5 contacts	38	38	39
6–10 contacts	12	10	16
More than 10 contacts	21	19	24
	100 (n = 390)	100 (n = 261)	100 (n = 129)

Note: Apparent errors in addition are due to rounding.

or less regular contact with the media (more than twice a year). Epidemiologists had somewhat more frequent contact with the media than stem cell researchers, which can be attributed to the high degree of relevance of epidemiological research both to individual health-related behaviour and to public health and risk policy. Apart from this, both groups of researchers differed surprisingly little in their views of and experience with the mass media.

Experienced (older) scientists and those with a higher level of scientific productivity were over-represented in our sample, compared with all the epidemiologists and stem cell researchers in German research facilities. This resulted in data that overestimated, to a certain extent, the average degree of experience with the media among all researchers. If one compares the frequency of media contact from our sample with an older survey taken from a broader disciplinary spectrum of scientists (Strömer 1999: 32), nothing indicates that the two research fields that we studied are extreme cases in terms of the extent of media contact. Also, considering the similarity of results in both research fields, we suspect that the basic findings of our scientist survey can be generalized, at least in the field of biomedicine, with the exception of a very limited number of topics in which a crisis exists in the relationship between science and its social context.

Scientists seldom contact journalists on their own initiative. Two previous studies sought to determine which side initiated contact—scientists or journalists. The results consistently indicated that 80% to 90% of the talks were initiated by journalists, while only a small percentage were initiated by scientists, and an even smaller percentage by third parties (Projektgruppe Risikokommunikation 1994, Peters and Heinrichs 2005). However, the circumstances of contact are somewhat more complicated than can be ascertained by the simple question of who initiates contact. Even though contact between scientists and journalists is usually initiated by journalists, it is often the case that institutionalized PR activities are involved—through press releases, presentations on websites, or referrals based on non-specific journalistic enquiries to PR offices.

The extent of media contact with scientists is not influenced primarily by subjectively perceived ‘costs’ and ‘benefits’, or by affective advocacy or rejection of such contact. Rather, it is dependent on the status of the scientist as measured by the number of scientific publications, and by whether the scientist occupies a leadership function as a project/group leader or head of an organizational unit or department. The relative independence of subjective factors indicates that willingness to have contact with the media is an institutionalized part of the leadership role within science. It is apparently expected that scientists with a leadership role will maintain contact with the media.

A surprisingly high percentage (42%) of the surveyed scientists who have had contact with the media regarded it as beneficial to their scientific careers, while only a small percentage (3%) considered it to be damaging. The rest saw either no effect (30%) or ambivalent effects (24%). If one considers this subjective estimate by those surveyed to be accurate, it follows that media visibility or expected media interest in candidates is among the implicit decision criteria for people within organizations who are responsible for selecting and promoting scientists, extending grants of support, selecting cooperation partners, and so on.

Because scientists are members both of scientific communities and of science organizations, the question arises as to which of those contexts is more important for the regulation of relationships with the media. Does the career-promoting effect arise because media contact boosts a scientist's reputation within the scientific community, or because science organizations regard that media orientation as a positive factor in addition to scientific reputation? Below, we discuss the relative relevance of the scientific and organizational contexts.

5.2.3 The Influence of Scientific Norms

Previous studies of the relationship between science and the mass media found indications that the norms of the scientific community tended to discourage media contact by scientists (for example, Dunwoody and Ryan 1985). Unlike those studies, our survey did not indicate a basic negative sanctioning of media contact by the scientific community. Only a quarter of the surveyed scientists named *'incompatibility [of media contact] with the scientific culture'* as an important concern in possible media contact (see Table 5.2).

In a question about the motivating/demotivating significance of eight possible considerations against and eight considerations for media contact, two oppositely formulated items were included that made reference to the expectation of possible reactions by colleagues: *'Possible critical reactions from peers'* and *'Enhanced personal reputation among peers'*. By combining the reactions to these two items in an index, one can make the assessment that considerations about how colleagues would react were irrelevant for nearly half (47%) of the surveyed German scientists, and that otherwise motivating/demotivating influences from the expected reactions of colleagues are basically equally represented (motivating for 18% of those surveyed, demotivating for 21%, ambivalent for 14%).

Interestingly, the expectation of a negative reaction by colleagues is only weakly associated with the extent of scientists' contact with the media (Kendall's tau-b = 0.11, $p < 0.05$)—a further indication that scientific norms are not essential barriers to media contact. However, one of the few less clear differences between the two scientific communities is evident here: among epidemiologists, the association is significantly stronger (tau-b = 0.27, $p < 0.001$) than among stem cell researchers (tau-b = 0.03, n.s.). This is probably because epidemiologists fear criticism from colleagues mainly on the basis of medical ethics and not on the basis of scientific norms, as is the case with stem cell researchers.

However, scientific norms are far from irrelevant in attitudes towards communication. Aside from the influences already mentioned, some of which are motivating and some demotivating, scientific communication norms create expectations about the ways and means of journalistic representation. In our survey, 82% of the scientists stated that the *'risk of incorrect quotation'* was a cause of serious concern in contacts with the media. The statements *'Journalists should be guided by scientific peer review standards when selecting topics and sources for their stories'* and

Table 5.2 Significance of Scientists' Motives and Considerations in Possible Contacts with the Media

	All[a] (%)	Stem Cell Researchers[a] (%)	Epidemiologists[a] (%)
Possibility of negative publicity	55	57	52
Loss of valuable research time	56	58	52
Unpredictability of journalists	80	80	80
Possible critical reactions from peers	35	38	28
Possible critical reactions from the heads of department or organization	42	44	38
Possible critical reactions from the public	47	53	35
Incompatibility with the scientific culture	25	25	27
Risk of incorrect quotation	82	82	82
Increased visibility for sponsors and funding bodies	84	86	80
A more positive public attitude towards research	97	98	95
Enhanced personal reputation among peers	32	30	35
Enhanced personal public reputation	44	42	47
Fulfilled responsibility to account for the taxpayer's money	58	61	52
Influence on public debate	89	89	90
A better educated general public	95	94	96
Enjoyment of interacting with journalists	15	14	18
	(n = 397)	(n = 266)	(n = 131)

[a] Percentage of those surveyed that considered the corresponding factor 'very important' or 'somewhat important' in the decision to make contact with the media (more than one entry possible).

'Scientists should communicate research findings to the general public only after they have been published in a scientific journal' met with emphatic agreement (mean values of 1.0 and 1.1, respectively, on a five-step rating scale of −2 'strongly disagree' to + 2 'strongly agree'). The majority of scientists would like to see journalistic science reporting held to scientific quality-control standards. The PR survey showed that scientific publications are also an important basis for organizational PR. One reason for this is that science journalists consider scientific publication (especially in well-known journals) to be an event worthy of media coverage. However, a further reason is that press offices themselves face the problem of how to assess the quality of the scientists' work within their own organizations. They do not want to risk damaging their organization's image by associating it with research of dubious quality.

As in earlier studies (see Peters 2008), our survey indicated that scientists request to check stories in which they are quoted which is rejected by journalists as an encroachment upon their autonomy. The statement, *'Journalists should permit scientists to check stories in which they are quoted prior to publication'* was

received with almost unanimous strong concurrence (mean value of 1.7 on a rating scale of + 2 to −2). This demand can be understood as an attempt to instrumentalize journalism for the attainment of the communication goals of the scientist or organization cited. However, it can also be seen as a transfer of intrascientific communication scripts (that is, as an analogy to the proofreading of scientific publications). The implications are that the scientists are the authors and that they relegate journalists to the role of pure information brokers.

In summary, in both the research fields studied, the norms of the two scientific communities do not generally discourage media contact; rather, they are either neutral or ambivalent towards such contact. However, the scientific culture leads to expectations about the ways and means in which science is publicly presented and about to the role of scientists in relation to journalism.

5.2.4 The Organizational Context of Public Communication in Science

As our PR survey showed, science organizations—especially through their PR offices—have a significant influence on how the media cover research (see Baerns 1990):

- They produce and disseminate their own content to media editorial departments and journalists by means of press releases, press conferences and exclusive information.
- They increase the visibility of their scientists to journalists and encourage the scientists to be in contact with the media.
- They manage media queries to the organization and, when necessary, forward them to scientists who seem to be suited to handling them.
- They observe and regulate—usually in subtle ways—direct contacts between scientists and journalists that occur without their involvement.

Of course, all these processes work selectively. In other words, the PR department controls the representation of its organization so that the interests of the organization are promoted. These consist above all of the general legitimization of the organization in the eyes of those on whom it is dependent (both politically, in terms of regulation, and financially, for support), increasing the organization's position in various markets (e.g. training and research services, third-party funds), and exercising influence on political decisions relevant to research.

Depending on the organizational leadership's and PR staff's implicit media effect models, a number of communications goals result. General goals are a high media presence, a positive image and the development of a characteristic organizational profile or the establishment of a 'brand'. Specific goals include the marketing of services, the representation of the organization's positions in the public political dialogue (issues management), and attitude and behaviour change of the population (e.g. through education on health risks). The way these goals are ranked varies from organization to organization.

Scientific successes that are attributed intrascientifically to specific individuals form the basis of the proof of performance of research organizations, especially of non-university research organizations that cannot refer to the 'educating' function as a primary or supplementary legitimizing activity. The close integration of scientists into organizational PR is indicated, for example, by the high percentage of scientists (69%) who said in our survey that they had provided information to their PR department in the past three years.

According to their answers, nearly a third of the surveyed scientists require the approval of their science organization before speaking to journalists. Rules that require scientists to obtain approval for contact with the media, or that require them at least to notify the PR department of pending or completed press contact, are intended not so much to prevent such contacts as to ensure that they are conducted in accordance with the interests of the organization. Generally, press offices make efforts to motivate scientists to increase contact with the press rather than hinder it.

The influence of the organizational context on media contact with scientists is somewhat weaker in universities than in non-university research organizations and university clinics. This is confirmed by the fact that for university scientists the expectation of a critical reaction from the organization is less important in the decision about whether to make contact with the press, and by the fact that they are significantly less often required to obtain approval for media contact. In clinics, there is generally a more careful attitude towards the media than in universities and non-university research organizations. Scientists in clinics are somewhat less likely to consider contact with the press advantageous to their careers, and in the interviews with public information officers of clinics it was more often mentioned that it was necessary to avoid media attention. One reason for this is the relevance of medical ethics in the work of university clinics; for example, raising unfounded hope in patients through overoptimistic media reports of new therapies is regarded as ethically wrong. Another reason is that the threat of scandalous media reporting of possible malpractice or controversial clinical studies is greater for university clinics than for other research organizations.

The current situation of PR in research organizations is characterized by a paradigm shift that can be understood in the context of the 'managerial revolution' in German universities described by Maasen and Weingart (2006). However, that transformation is not limited to universities; rather, it includes the entire research landscape. In the field of PR, there is strong evidence that PR is no longer seen as a fulfilment of a generally understood 'obligation of science to actively provide information to the public'—that is, as a duty or service to the public—but rather as the consistent pursuit of organizational strategic goals, which is analogous to PR's role in the corporate world. Terms such as 'research marketing', 'brand development' and 'branding' are common in the current parlance of public information officers. The goal is no longer simply to ensure 'good press', but—in the sense in which Merten (2000) defines PR as a 'process by which desirable realities are constructed'—to sharpen a precisely defined media image of the science organization that meets the anticipated expectations of the state funding bodies, and that at the same time is attractive to customers in the markets for education, consulting, health and R&D services.

To attain this strategic goal, it is necessary to fine-tune the way the organization presents itself, which is ultimately only possible with central control over all public communication and a commitment by all the members of the organization to adhere to its public communication policies. Such attempts to centralize media communication push against limits—especially in universities—created by the high degree of autonomy afforded by law and tradition to professors and heads of institutes, as well as by the competing loyalties of researchers who feel predominantly obligated not only to 'their' university or research institute, but also to their scientific community, potential clients, a political mission or an interorganizational collaborative project.

5.2.5 Acceptance of Media Communication as a Separate Arena

The PR survey revealed that anticipated media expectations constitute key selection criteria for PR departments. Otherwise, successful PR would not be possible. Public information offices emphasize the rules of the media when dealing with scientists, leading to one of the relatively few typical conflict patterns indicated in the surveys. In the main, PR departments promote acceptance of the ways journalists work, and select scientists for their PR work partly based on the scientists' acceptance of the media's rules of the game.

Despite occasional frustrations, the interaction between scientists and journalists is usually relatively tension-free. In line with earlier German findings (summarized in Peters 2008), our survey indicates that, on the whole, the interaction between scientists and journalists runs smoothly, and that the resulting journalistic coverage enjoys a high degree of acceptance. Of the scientists who had contact with the media in the past three years, 77% characterized their experience as 'mainly good', while only 3% considered it 'mainly bad'. The remaining 20% believed that good and bad experiences were relatively balanced. The generally positive evaluation of contact with the media is evident not only in the general assessments, but also for specific interactions and across a broad range of individual aspects of the interaction (see Table 5.3).

Scientists' evaluations of interactions with journalists, being for the most part positive to ambivalent and only occasionally negative, indicate that in most cases journalism does not seriously offend the central criteria of the scientists acting as sources. Despite conceptual discrepancies with journalistic practice pertaining to the communication model and the consequent normative expectations, communication with the media is pragmatically successful, according to the scientists we surveyed.

Apart from scientists accepting the expectations of the media, the main reason for the generally positive assessments is that reporting by the media in most cases serves scientists' pragmatic communication goals, even though that reporting might violate scientific communications norms. In a list of eight motives for making media contact, the one attracting the highest level of agreement was the goal of creating *'a more positive public attitude towards research'* (see Table 5.2). This corresponds to

Table 5.3 Summarized Assessment of Personal Media Contacts in the Past Three Years

	All[a], $\bar{x}$	Stem Cell Researchers[a], $\bar{x}$	Epidemiologists[a], $\bar{x}$
I was able to get my message out to the public	0.9	0.9	0.8
The journalists treated me with little respect	−1.2	−1.2	−1.2
The information I gave was inaccurately used	−0.8	−0.9	−0.6
The journalists asked the right questions	0.5	0.5	0.4
I felt unsure when talking to the journalists	−1.1	−1.1	−1.0
My statements were distorted	−0.9	−0.9	−0.9
The journalists really listened to what I had to say	0.7	0.7	0.8
I received favourable publicity	0.8	0.9	0.7
The most important information I gave was omitted	−1.2	−1.3	−1.1
Talking to the journalists was pleasant	0.9	1.0	0.7
My research was well explained	0.7	0.7	0.5
The journalists asked biased or unfair questions	−1.2	−1.2	−1.1
	(n = 274)	(n = 173)	(n = 101)

Note: Only scientists with personal experience of the media were included in the calculation.

[a] Mean values on a five-step scale, from −2 ('strongly disagree') to + 2 ('strongly agree').

the PR goal of legitimization; however, the PR offices of science organizations interpret this general goal specifically—as the legitimization of their own organizations.

Probably encouraged by PR, scientists base their assessment of their contact with the media on whether the contact had the intended persuasive effects (e.g. in legitimization), and the mostly affirmative journalistic coverage of science seems to have these desired effects, according to the scientists themselves. The feared or actual violation of specific scientific criteria, particularly the criterion of accuracy, is apparently secondary in their view. The surveyed public information officers confirmed, for the most part, the predominantly affirmative characterization of science—indicated, for example, by the fact that investigative science journalism is not very common. The PR officers also pointed to the readiness of the media to accept PR material (e.g. press releases) relatively uncritically and sometimes even without reference to its source.

Previous studies indicated that many scientists considered science-related media communication as an 'extension' of intrascientific communication. The alternative to this is the belief that media communication about science is an independent arena, in which specific rules—different from those of intrascientific communication—apply (see Peters 2008). Scientists' astoundingly high level of satisfaction with science reporting, despite the inner logic of the media and the dominance of

the legitimizing goal in media communication, is best explained by the second model (media communication as its own arena). For organizational science PR, the applicability of this model is obvious. However, we suspect that this model is also the pragmatic basis for the way in which most scientists with media experience deal with the media.

5.2.6 Effects of the Medialization of Science

The medialization of science and the related professionalization of organizational science PR have a number of consequences for science's self-representation, and consequently for the public image of science and scientific knowledge. The selection and construction of topics offered to the media within the framework of proactive PR, as well as reactions to media requests, simultaneously meet two central criteria:

- The anticipated expectations of the media as a prerequisite for an opportunity for publicity
- The goals of scientific communicators, based on their interests in legitimization, profiling and political impact

A likely direct effect of the medialization of science, as opposed to a hypothetical condition of non-medialization, is an increase in the public presence of science. Increased media presence is aided by:

- A reduction in the journalistic effort because of journalistic work done in advance and the proactive 'push' strategies of scientific PR, which allow for savings in the production of science-related media content
- Better adaptation of scientific topics to journalistic rules of selection and construction (that is, ultimately more attractive scientific topics for the media audience)

A truly surprising observation is that for many actors, including most of the scientific public information officers involved in the study, an important goal is a *mere mention* in the media as frequently as possible (as long as it is non-deprecating). There is a forced presumption that media presence in the 'media society' is a universally effective indicator of social relevance. This assumption also follows from Kohring's (2005) concept of journalism.

A second effect of medialization is the use of non-scientific frames of reference in scientific self-representation. In the field of biomedicine, a 'relevance' construction based on practical applications and corresponding non-scientific benefits seems obvious, and was consistently confirmed by the surveyed press officers. The hermeneutic analysis of media reporting on epidemiology indicated that epidemiology is characterized as a legitimate basis for political regulation (see below). To this extent, political connectivity exists for a self-representation of epidemiological research that is focused on practical effects. In addition to being a relatively simple

adaptation to the media's attention rules, focusing on practical use has the advantage, from the perspective of science organizations, that they can legitimize themselves not only with research successes (which do not interest everyone) but also with the prospect of practical benefits.

A particular image of science is portrayed when research is selected based on the rules of media attention and organizational legitimization (through the benefits of application and direct relevance to patients), or when emphasizing potential practical relevance in the presentation of basic research. This creates the impression that biomedical research is strongly oriented towards patient interests, rather than to the scientific goals that it has set for itself. The tendency to present science as a process driven by an orientation towards practical problems may also exist in other areas besides biomedicine.

Indeed, stem cell research is a scientific field that is currently dominated by other images of science. Here, the hermeneutical media analysis identified three main meaning patterns, in which science is constructed as either 'sport', 'guild' or 'hubris'(see Jung 2007a for more details):

- The 'sport' pattern relates to the competition between national teams of scientists. Scientific success is implicitly presented in this pattern as first place in a competition, rather than as progress in knowledge acquisition or as a solution to practical problems.
- Science as 'guild' refers both to processes of intrascientific self-regulation (for example, in dealing with the scandal involving South Korean cloning researcher Woo-Suk Hwang), and to conflicts of interest between science and society (such as the acceptance of research using human embryonic stem cells).
- In the 'hubris' pattern, fantasies of the omnipotence of science emerge as a threat to basic social values, and scientists are portrayed as irrational and unscrupulous.

The function of such meaning patterns, analysed here using examples from stem cell research, is to transform scientific complexity into a form that connects to the everyday culture of modern Western societies through abstraction from factual complexity and respecification of science on the social and normative levels. This results in the inclusion of the audience, in the sense that each person will be located on either one side or the other of a social relationship.

For the purposes of self-representation, sources of scientific information selectively connect to meaning patterns used by the media that create a positive image of the participating scientists and science organizations, or that imply political support for the research. In addition to the application perspective that we have already mentioned, this is especially the case with the sport pattern. Association with that pattern can be used to indicate a success (for example, so that a 'world record' can be touted). But the sport pattern can also be used to demand political support by referring to the competitive disadvantages of the German 'team' compared with the international competition, due to handicaps created by political constraints.

The PR interviews identified further content-related selectivities derived from organizational interests. For example, organizational science PR is not interested in legitimizing science in general, but rather in legitimizing its own science organization.

Results of research produced in the social context of scientific communities that cross organizational borders are appropriated by science organizations and represented as their own achievements. This creates a specific public construct of science—differing from science's own self-image—in which science *organizations* are regarded as the producers of knowledge.

While in the scientists' survey we found some evidence of a medialization of the *research process*, the PR survey did hardly indicate that this form of medialization is specifically catalysed by the public information offices. To the extent that conflicts involving the public acceptance of research topics or methods were discussed in the interviews, the surveyed public information officers mostly sided with scientists, and stated that they used the communication means at their disposal to defend the right to conduct research and would not shy away from conflict with the public if necessary.

5.3 Political Effects of the Media's Thematization of Scientific Topics

5.3.1 Legitimacy of Scientific Knowledge and the Autonomy of Science

The picture painted by the surveyed public information officers, of a predominantly affirmative journalistic treatment of scientific topics as the rule, corresponds to a high level of social trust in science. In public opinion surveys, science is regularly shown to enjoy more public confidence than politics and economics. What is noteworthy about this is that the difference in the levels of trust is not primarily due to a belief that science is more competent; rather, it can be attributed to the assumption that science is independent of interests and oriented towards the common good (Peters et al. 2007). The result is that with 'normal' scientific topics there is essentially little appeal for critical investigative journalism, which generally focuses on contradictions between partial interests and the common good.

The fields selected as case studies—stem cell research and epidemiology—differ in how they are portrayed by the media. Reporting about epidemiology corresponds to the affirmative default. Although public conflicts occasionally arise in epidemiology over the validity of scientific knowledge or the practical results that can be obtained from it, the legitimacy of the science is not called into question. In contrast, in reporting of research using human embryonic stem cells, the issue is the reconstruction of a research field in which a crisis in its relationship with its social context has developed because of tensions between the expectations of researchers and social values (see Jung 2007a,b).

The image of science constructed in articles about epidemiology corresponds to the traditional expectation of science as a producer of safe, objectively true knowledge that is a legitimate basis for political regulation. The fact that scientific knowledge, at a given point in time, is limited and uncertain is not perceived

as a 'crisis' of science; rather, it results in a demand for more and/or better research. Scientific knowledge is sometimes called into question in articles about epidemiology. These articles refer to factual contradictions in statements by different scientists, weaknesses in method, and the distorting effect of external influences on the process of knowledge generation, but the critique is directed at concrete research and not at the science per se (in fact, the 'idea' of science is defended in these articles). Finally, political interference in the scientific process is criticized, underscoring the legitimacy of the autonomy of science.

In summary, the analysis of the epidemiology articles showed that, in certain respects, science occasionally has a credibility problem, but that simultaneously the authority and legitimacy of science—as a form of knowledge, as a process through which to obtain knowledge and as an institution—are reinforced and supported.

In the political arena, this image of science has two key consequences. First, it strongly suggests that the political-administrative system should consider epidemiological knowledge as a basis for health-care policy regulation, underscoring the political relevance of science. Second, it demands respect for the autonomy of science, in so far as it delegitimizes political interference in the process of knowledge generation.

Conversely, the constructs of science ('sport', 'guild' and 'hubris') that are present in reporting of stem cell research imply, to a certain extent, the necessity and legitimacy of political regulation of research. None of these meaning patterns contests either the importance of scientific knowledge or the responsibility of science to generate knowledge; however, the implication is that constraints on science have to be defined according to the interests of society. Applying the hubris pattern, it is necessary to protect society from scientists' fantasies of omnipotence. In one variant of the guild pattern, the autonomy of science is legitimized through self-regulation (for example, as seen in the Hwang scandal). In another variant, as in the hubris pattern, political control of science is seen as necessary to the extent that the interests of science are perceived as being opposed to those of society. Finally, the sport pattern implies political support of stem cell research in order to make the German 'stem cell team' internationally competitive.

5.3.2 'Mechanisms' of Political Effectiveness

According to the thesis of the medialization of politics, media reporting is an important orientation framework for politics. In our survey of decision-makers in the political-administrative system, especially of those responsible for subjects related to health care, we sought indications of whether and in what form the media presence of scientific actors and scientific knowledge had effects that either contributed to the legitimacy of science or to the use of scientific knowledge in policymaking.[3]

The institutionalized effort invested in media observation—in the form of press summaries and timely monitoring of news agency press reports—and the intensity

[3] This is addressed in more detail in Heinrichs and Petersen (2006) and Heinrichs et al. (2006).

of personal media use among decision-makers underscore the high significance attached to media reporting in the political-administrative system.

The relationship between politics and the media has been intensively researched from the perspective of an influence of politics on media reporting (see, for example, Palmer 2000). However, the decisive question about whether decision-makers orient themselves to the media and the effects this has on the political process is much less the subject of detailed research. In our interviews with decision-makers, five general functions of the mass media in the political process could be identified, in addition to the public depiction of politics mentioned above:

- *Topic monitoring and early warning*. The decision-maker interviews confirm, in agreement with the agenda-setting theory (Shaw and McCombs 1977), a high degree of influence of media reporting on the attention structure of politics. In the view of decision-makers, detailed and timely monitoring of topics that fall within their areas of responsibility or specialization, especially topics involving political competitors and other relevant actors, ensures the connectivity of their own activities and also fulfils an early warning function.
- *Media resonance as political success and relevance indicator*. Media reporting provides feedback on political activities. Observation of media coverage is a way to monitor success, in which the criterion of success is media resonance. Optimization of political activities vis-à-vis media response, made possible through media feedback, primarily affects the *presentation* of political initiatives. It is also likely that fields of political activity are adjusted as a result (for example, political initiatives that do not get a response are abandoned, while fields of political activity that elicit a high response are sought out) and, possibly, political positions may also be changed. An interesting implication of equating a high degree of (positive) media response with 'success' in politics is that the same criterion is probably also applied to other actors. Thus, in the political-administrative system, actors that appear frequently in the media (with good press) are seen as especially successful and 'relevant'.
- *Repertoire of arguments and rhetorical devices*. The media reflect discourses about issues, so a media archive is a documentation of issue culture (Gamson and Modigliani 1989)—in other words, an inventory of cultural elements, such as events, dates, metaphors, frames and symbols associated with a specific issue. Politics draws upon the elements of issue culture in order to generate effective messages for public communication.
- *An image of society*. Decision-makers use journalistic observations of society (Kohring 2005) to make inferences about the condition of society outside the political realm. Politically, this type of observation serves as a barrier against surprises; it allows problems to be identified before they become virulent and present a possible threat to legitimacy. In addition, the image of the condition of society created by the media can be used as a basis from which to assess whether new themes and initiatives would be 'connectable' to the general public or the realm of civil society and find resonance there.

- *Factual information and opinion formation*. Finally, the interviews indicated that, among decision-makers, the media provide background information for individuals and assist in opinion formation. Supporting opinion formation among media audiences is a general media function. However, when the media recipients are decision-makers, the individual formation of opinions by this political elite is presumably politically relevant.

These five general functions of the media for politics also create opportunities of political impact for media references to science or for arguments based on scientific knowledge. Scientific knowledge communicated through the media can trigger political activities with the agenda-setting effect, which is viewed partly as a problem because it can result in inconvenient pressure for action. When science organizations, scientific experts or scientific fields are mentioned in the media, those remarks are very likely to be interpreted by the political establishment as an indicator of social relevance. Scientific experts and arguments that are present in media content are sometimes co-opted in political rhetoric. Social scientific expertise in the media contributes to the drawing of a 'picture of society'. Finally, scientific knowledge could potentially be integrated into the political process via opinion formation among individual decision-makers. The advantage in relevance of scientific knowledge conveyed by the media lies in the fact that, because it has been subject to media logic, it is already sociopolitically recontextualized.

5.4 Conclusions

The empirical findings described in this chapter reflect the situation at a point in time and, as such, cannot directly support the thesis that science is subject to *increasing* medialization. However, we found a number of empirical indications that support the idea of a medialization of science: the high value accorded, both within organizations and among individual scientists, to science-related media communication; the institutionalization of media contact and its linkage to leadership roles; and the adoption of media logic for self-representation, resulting in a relevance construction based on non-scientific references. In addition, there are indications of effects of medialization on scientific knowledge production postulated by Weingart (2001), which we have not explored further in this chapter.

We examined the tendencies towards medialization in two biomedical research fields: stem cell research and epidemiology. The essential difference between the two fields, determined by hermeneutical media analysis, is that the media meaning structures in which stem cell research is reconstructed—especially those concerning its use of human embryonic stem cells—provide a partial legitimization of the political regulation of that field of research, while the coverage of epidemiology universally supported its right to autonomous research.

Because politics are medialized, the media presence of science (which is strengthened by its own medialization) has political effects. This is based, for the most part, on the following facts:

- The presumption of sociopolitical relevance is linked to the media presence of scientific actors, events and arguments.
- Science produces media-accessible events to which politics can connect.
- Media reporting makes arguments derived from scientific knowledge accessible (if necessary, by journalistically recontextualizing and honing them). Those arguments contribute to opinion formation among the political elite and are picked up in political rhetoric.

Political effects are associated, first, with the *legitimization of science* or science organizations. The critical aspect for legitimization is not 'trust in science'; public opinion surveys, our survey of press officers, and the hermeneutical media analysis all concur in confirming a high degree of social trust in the institution of science. The factor critical to legitimacy is the sociopolitical relevance of science or science organizations. Adaptation to media logic specifically requires the emphasis of non-scientific references in self-representation. Furthermore, in the political establishment's reception of the media, media presence is interpreted as an indicator of relevance. Therefore, the medialization of science contributes to its social legitimacy.

Secondly, adoption of media logic creates opportunities to *integrate scientific expertise into policymaking*. The special considerations in providing scientific expertise through media reporting (instead of directly through scientific evaluations or expert commissions) are:

- The media's typical sociopolitical recontextualization
- The implicit relevance assessment related to the selection process in reporting
- Broad and easy accessibility resulting from dissemination by the media and from journalistic processing (this final aspect can enhance the status of decision-makers on the periphery of issue-centred policy networks that are not involved in direct communication)

Professional science PR has an interesting role in the medialization of science. One might expect that, as the interface between the public and the media, it adopts public expectations and catalyses them into organizational goals. However, the empirical evidence points almost exclusively to effects on public self-representation, and hardly to effects on the core of knowledge production. On the contrary, the PR officers emphasized the right of science to autonomy. Therefore, scientific PR is a strategy for maintaining autonomy, in the sense that it decouples the media construct of science or the image of science organizations from the internal practice of knowledge production. That is, it produces a differentiation between the intrascientific or intra-organizational self-image and the public image. However, the gap between the intrascientific practice and the public self-representation cannot become too wide without running the risk of being journalistically 'uncovered' and thus creating a legitimacy crisis.

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