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Nanotechnology in the media

On the reporting in representative daily newspapers in Austria, Germany and Switzerland

Summary

The media play an important role in the formation of society's opinion by drawing attention to selected topics and bringing them closer to the public. This applies in particular to areas with which a large percentage of the population would otherwise have no direct points of contact, such as nanotechnology. The current study of selected print media in the German-speaking countries now reveals the general picture of nanotechnology in the media, what topics are given significant treatment, which actors are consulted, and explains that (at least as yet) there is no need for any concerns about risk-centred controversial reporting on this technology.

Introduction

The media can have a significant influence on the public image of science and technology, in the specific case nanotechnology. This is true in particular if only a small percentage of the population only comes directly into contact with such fields of research. Mass media reporting serves to increase awareness of selected topics, informs about current debates involving a wide variety of actors who need to be heard and thus also prepares a basis for future social debates.¹ The population is introduced to central aspects of technical applications, which also include the opportunities and risks associated with the new technologies.

For a number of years, scientists from a variety of disciplines (such as technology assessment, communication sciences and science and technology studies, STS) have been addressing the perception of nanotechnology in the public and its presentation in the media.² There are already international studies on media reporting which address national political and research activities in individual countries.³

Against the background of a number of media controversies concerning scientific and technological topics, such as genetic engineering,⁴ scientists and decision makers were concerned about the possibility of similarly emotional and risk-focused debates in the initial years of nanotechnology. This controversial reporting could have a negative influence on the public opinion concerning the acceptance of nanotechnology. The first comprehensive systematic analysis is now available, describing the media reporting of nanotechnologies in the German-speaking countries.⁵ A media analysis has been conducted of selected quality newspapers within the framework of the "NanoPol" project,⁶ which analyses the nanotechnology policies of Austria, Germany and Switzerland.

Quality newspapers are characterised by their target group, comprising persons who have a specific interest in national events and information and who are of significance as multipliers for opinion formation amongst the national public. At the same time, mass media as an ongoing observer⁷ in the public can contribute to determining the significance of the topic for the public discussion. For each country, two print media were investigated, the investigation period extending over ten years (2000-2009):

- Der Standard and Die Presse (A);
- Frankfurter Allgemeine Zeitung and die Süddeutsche Zeitung (D);
- Neue Züricher Zeitung and der Tagesanzeiger (CH).

An overview of nanotechnology in the daily press

A total of 1.998 articles were analysed in the course of a content analysis.⁸ They originate from a complete survey covering the years 2000 to 2009.⁹

Roughly 44 % of all articles were accounted for by the two German print media, while Switzerland and Austria had a share of 29 % and 27 % respectively, with in each case one national newspaper having published significantly more articles with nanotechnology topics. At the beginning of the investigation period, the frequency of articles still varied considerably in the different countries, but converged towards the end of the period.

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The reports on nanotechnology are overwhelmingly (88 %) to be found in fact-focused report formats such as news reports or background coverage, while a small percentage of the contributions are drawn up in the form of interviews, comments and essays.

Comparison between Austria, Germany and Switzerland

At the beginning of the last decade, the media echo in Germany was already very pronounced and declined over the course of the ten years. At the end of the investigation period in 2009, there was however once again a large increase in the number of articles. In Austria and Switzerland, the reporting on nanotechnology was still somewhat restrained at the beginning, but over the course of the years grew quantitatively in significance (see Table 1).

Austria recorded a reporting peak in 2004, followed by a period of high frequency. On average, roughly one article with a reference to nanotechnology was published each week in the selected Austrian and Swiss media (see Figure 1). Seen over the entire period, *Der Standard* reported twice as frequently on nanotechnology as *Die Presse* (0.7 articles compared with 0.35 articles per week), although the *Die Presse* articles tended to be somewhat more comprehensive than the reports in *Der Standard*.

A more in-depth analysis for Austria shows that the reporting was influenced by national occasions. The strong increase of the media resonance in 2004 and the continuing very strong reporting in the years 2006 to 2008 are due to the start and extension of research policy activities by Austrian government bodies. 2004 was the start of the Austrian NANO initiative,¹⁰ to which *Der Standard* also devoted one third of its nanotechnology reports in this year, including it in a number of special supplements. The increased interest in nanotechnology topics on the part of *Die Presse* started a little later, namely in 2006, when the first – commercially exploitable – results of the projects started within the framework of the NANO initiative were published.

Table 1: Number of articles with a nanotechnology focus broken down according to print media 2000-2009 (Source: NanoPol)

Articles	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
Der Standard	14	20	26	24	59	36	44	58	55	24	360
Die Presse	8	6	13	20	19	22	34	26	20	18	186
FAZ	91	91	87	61	63	45	64	55	36	74	667
Süddeutsche	20	17	18	21	27	19	31	15	8	26	202
NZZ	25	34	38	34	33	33	51	42	41	34	365
Tagesanzeiger	31	13	17	20	14	17	19	29	32	26	218
Total											1.998

The topics

The thematic focal points of the media investigated are of particular interest, since these involve more than mere references to technologies in the media but instead constitute a first perception of a topic by a broad public.

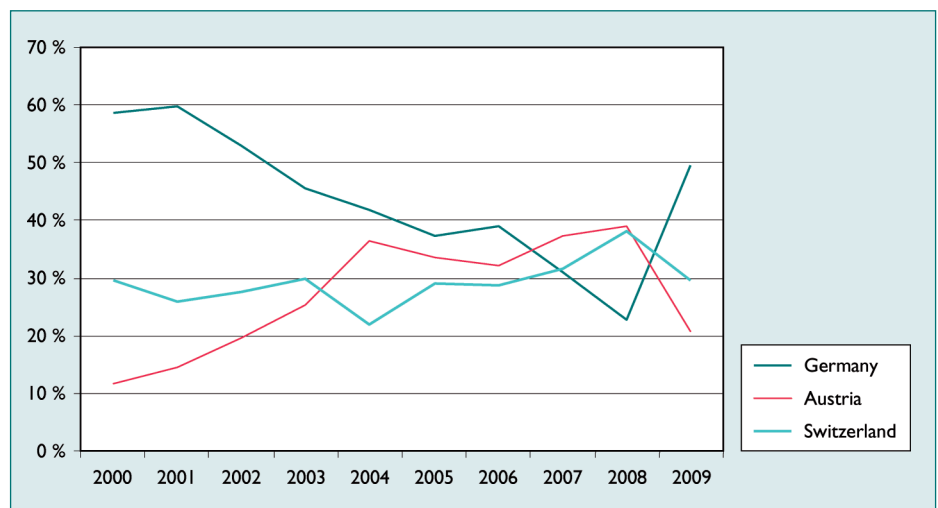
For the study under discussion, 23 topic categories with corresponding subcategories were drawn up. The five following topic categories attracted particular attention in all three countries:

- Basic research and nanotechnology in general
- Field of application: information and communication technology
- Field of application: healthcare¹¹
- Business
- Politics.

Topics related to basic research, which for instance include toxicology and risk research, constituted an in part clear majority in all three countries. Applications in the field of information and communication technology, extending from data media to sensors, were the second most frequently referred to topic. Medical applications, from diagnostics to specific therapies, occupied third place in all three countries, although relatively speaking there were somewhat more reports about medical topics in Austria than in the other two countries. Reports from the field of business and politics, dealing above all with companies, research subsidies, environment and economic policies, occupied places four and five.

In the course of the period under investigation, it is apparent that in the initial stages articles were published on topics that on the one hand were related to visions (such as information and communication technology and nano-bioengineering) and the local-

Figure 1: Reporting according to countries and years (absolute) (Source: NanoPol)



isation of nanotechnology in society (such as ethical and commercial aspects). In contrast, over the following years, the media investigated raised the topic of the use of nanotechnology on the basis of specific applications – such as questions of regulation and standardisation, and surface coatings, health and energy economy aspects.

The news sections

As usual for classical scientific reporting, a large percentage of the articles were published in the science sections of the newspapers. In addition, articles related to the topic of nanotechnology were also published in the feature pages and in various supplements of the print media investigated. While the articles in the feature pages were almost entirely in the German media, Austria was responsible for the overwhelming percentage of the articles in the special and week-end supplements. Almost all Austrian articles in supplements were published in that of *Der Standard*. Almost one half of all *Der Standard* articles in 2004 were published in a number of special supplements that referred to the NANO initiative already mentioned. This permits the conclusion that media in Austria take up and report on national research policy topics and agendas. While *Der Standard* mainly regards nanotechnology as a scientific topic, *Die Presse* also sees it as being relevant for other social sub-areas and distributes the articles more broadly across its sections.

The actors

Various actors are repeatedly consulted for newspaper articles in order to emphasise aspects of content or different perspectives on the topic. Thus actors are cited who are attributable to specific social sub-areas. In science reporting, it is mostly scientists themselves who are cited on the issue of developments in this field, or politicians when addressing the topic of research policies or regulation.

In the reporting on nanotechnology, reference is mostly made to specific actors (and groups of actors) and their activities. **Scientists** are, according to the analysis, the group of actors who are by far most frequently mentioned. This is typical for science reporting, as is the fact that the majority of the articles appeared in the science sections of the newspapers. Just under one fifth of the actors are persons from the field of **business**, a result confirmed by the strong thematic interest in commercially relevant fields of application. **Journalists** themselves also appear regularly as actors in the articles, in particular in Germany, where this is due to the reporting in the *Frankfurter Allgemeine Zeitung* at the beginning of the last decade, in which renowned scientists and developers from the field of nanotechnology functioned as authors and were then entered in the study's data records as belonging to the "journalist" group of actors.

In all three countries, political actors play a comparatively small role, with neither **political institutions** nor **decision-makers** making a significant contribution to the media discourse on nanotechnology. This is also related to the fact that nanotechnology has hitherto been treated in the media not as a political topic but rather as a topic within the field of science.

Civil society organisations such as environment or consumer protection organisations, which from experience tend to adopt a critical approach to controversial technical developments and mostly take-up opposing positions to the actors from science and business, play a clearly subordinate role (in Austria only 2 % of all actors identified). This could be an indication that nanotechnology has hitherto not had such an effective media presence, which would subsequently have encouraged a controversial reporting.

Benefits and risks of nanotechnology in the media

Opportunities

As mentioned at the beginning, scientists and political decision-makers have been and continue to be concerned that nanotechnology could trigger similar media controversies as have been and are still being conducted in the field of genetic engineering, for instance. The results of the present study show that these concerns are groundless, at least in the German-speaking countries.

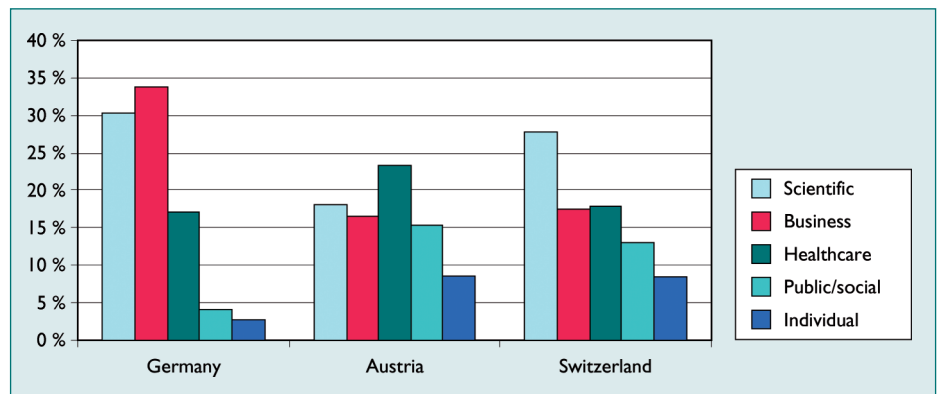
In the daily newspapers examined, the opportunities and benefits¹² of nanotechnology were raised much more frequently than the possible risks. 86 % of all articles mentioned at least one beneficial aspect, while risks played a role in only 14 % of the articles. In a country comparison, there were more reports about the risks in Austria (24 %) and Switzerland (24 %) than in Germany (13.7 %).

In the three countries together, the **scientific benefits** through the advancing of knowledge for research are most frequently raised. The **economic benefits** of nanotechnology and nano-technological applications are also very frequently the point of focus. Opportunities in the **medical sector** are likewise raised relatively often. The opportunities of nanotechnology that might result for **individuals** or **society** are also addressed, but to a much smaller extent than the areas mentioned above (see Figure 2).

A particular feature for Austria is that the two media gave particular large attention to the opportunities that nanotechnological developments might have in medicine. Opportunities for the environment or for military developments, which are regularly raised at international level, were only very rarely addressed in all the media examined.

Figure 2:

The five fields with the most frequent references to benefits (Source: NanoPol)



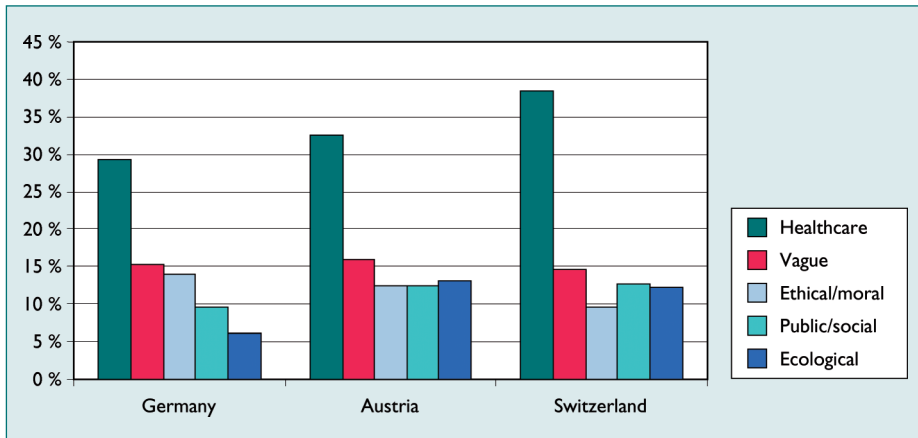


Figure 3: The five areas with the most frequent references to risks (Source: NanoPol)

Opportunities over the course of the study

Over the 10 years, the frequency with which scientific opportunities were raised fell significantly. Where at the beginning of the decade the ecological opportunities of nanotechnology were not an issue to which much attention was paid, they nevertheless increased in significance over the course of the years. This can be regarded as an example of how certain thematic aspects of nanotechnology are only taken up as an important argument in support of nanotechnology over the course of the years. What is also astonishing is that the number of references to vague benefits that are not specified further also increased over the course of time, since one would tend to expect that increasing differentiation and clear fields of application of the technology would go hand in hand with specific details of the benefits.

Risks

Medical risks played by far the largest role in all three countries. Frequently, there was also a **vague notion of risk**, with nanotechnology of itself as a rule being referred to as a risk. Likewise, the media examined referred to the **ethical and moral reservations** that might accompany nanotechnology. Risks for the **public** or the **environment** were also raised in the articles. At this point, we should note that only a small percentage of the in any event very few articles that mention risks report about the various aspects of risks.

Risks over the course of the study

Medical risks increased in importance in the course of the 10 years. From 2003 on, they constituted at least 30 % of all references to risks, and in 2009 over one half of all references to risks concerned the medical sector. This suggests the assumption that increasingly concrete applications and a stronger research sector investigating above all questions of human toxicology are responsible for this increase. Ecological risks likewise became more important from 2003 on, this topic also being regularly brought up in subsequent years. Ethical and social risks, which seen overall were mentioned relatively frequently, reached a peak at the beginning of the century and fell significantly in importance over the following years.

Conclusions

The reporting on nanotechnology in the media in the three German-speaking countries is largely science-centred and attracts a generally low level of attention amongst the broad public thanks to its less emphasised placing.¹³ There is hardly any opinion-focused reporting, with classical news reports and reports relating to current research activities or events predominating. In all three countries, the newspapers' science departments play a dominant role, and scientists also play a central role as actors.

There are reasons for assuming that the newspapers largely refrain from proactive science journalism on the topic of nanotechnology. Investigative journalism and reports that result from a journalist's own research are rare. The reports themselves could be referred to as unruffled and conflict-free, frequently serving as a means for presenting outstanding achievements. An event-focused positive representation predominates. A focus on risks and controversial reporting, a concern raised regularly in expert circles, was not proven in the present study. Risk topics play a role in fewer than 20 % of articles; the benefits and opportunities of nanotechnology, on the other hand, are mentioned in 80 % of all articles. Benefits are seen above all for science. Scientific actors are likewise mentioned relatively frequently, which indicates the close connections between science and business, and the economic expectations of nanotechnology. One would have to examine the extent to which the absence of controversies can be attributed to the hitherto lack of evidence of possible dangers and risks or to well-functioning strategic scientific PR work.

Notes and References

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- ⁵ For comprehensive details see Haslinger, J., Hocke, P., Hauser, C. and Fiedeler, U., 2012, Ein Teilerfolg der Nanowissenschaften? Eine Inhaltsanalyse zur Nanoerberichterstattung in repräsentativen Medien Österreichs, Deutschlands und der Schweiz, ITA-manu:script 12-04, http://epub.oeaw.ac.at/ita/ita-manuscript/ita_12_04.pdf.

- ⁶ The “NanoPol” project is a cooperation between the Institute for Technology Assessment and Systems Analysis (ITAS) at the Karlsruhe Institute for Technology (KIT), the Institute for Technology Assessment (ITA) at the Austrian Academy of Sciences (OeAW), TA-Swiss in Berne and the Programme for Science Research of the University of Basel.
- ⁷ Gerhards, J. and Neidhardt, F., 1993, Strukturen und Funktionen moderner Öffentlichkeit – Fragen und Ansätze, in: W.R. Langenbucher (ed.): *Politische Kommunikation – Grundlagen, Strukturen, Prozesse*, Vienna: Braumüller, 60-68.
- ⁸ A detailed description of the method can be found in *ITA-manu:script 12-04* (EN 5).
- ⁹ This means that each newspaper article within the media under observation that dealt with nanotechnology at least to some extent was analysed.
- ¹⁰ See <http://www.nanoinitiative.at>.
- ¹¹ The field of application “healthcare” covers the fields of medicine, medical technology and pharmacology including diagnostics, therapies and medicinal products. In the present study, the terms medicine, medical applications and healthcare were therefore used synonymously.
- ¹² The terms opportunities and benefits were used synonymously in the present study.
- ¹³ Cf. also the role of science reporting in: Marcinkowski, Frank, 2010, Framing Nano – Das Bild der Nanotechnologie in deutschen Printmedien, *Vortrag am ITAS im KIT*, 6.12.2010, Karlsruhe.

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