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Everything, but hardly any science fiction:

A topic analysis of German media coverage of AI

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One pillar of the Opinion Monitor Artificial Intelligence [MeMo:KI] project explores media coverage of AI. In this factsheet, we present a topic analysis of the coverage of AI by the highest-circulation regional and national media, as well as specialist news media, in Germany from 2018 to 2021. To do so, we used an automated content analysis to evaluate a total of 4,968 news articles. We show that German media coverage of AI can be broken down into 25 topics, which can then be assigned to six overarching categories: "Economy", "Science", "Technology", "Ethics & Society", "Politics", and "Arts & Culture". Three core results can be derived from our findings. First, media coverage of AI is strongly event-driven and fluctuates considerably over time, with events such as the publication of the AI strategy, the AI Act, and the Corona pandemic having an impact on the number of articles published on AI, and on the subject matter that these articles cover. Second, while media coverage is quite broad in terms of the topics that it focuses on, it is clearly dominated by an economic perspective on AI that emphasizes AI's economic value. Third, there are differences between media genres, since both the amount and thematic focus of coverage are influenced by the channels through which end users learn about AI. We conclude that, while German coverage focuses on various topics, it tends to foreground the benefits of the economic application of AI. Given that, we can ask whether the goal of a human-oriented AI is at all possible without a stronger emphasis in the media on social and ethical issues.

Artificial intelligence (AI) is said to have a major impact on almost all areas of society. Driven by international competition and the prospects of economic growth, both the tech industry and politicians are promoting the large-scale development of AI technologies. Private-sector investment in the EU tripled in the 2020-2021 period, with the German economy ranking fifth in the world at just under €2 billion (Zhang et al., 2022). In 2018, the German government published its AI strategy (2018), which calls for investment in business and research, while also emphasizing that AI development should be oriented towards the needs of the general public. As with various other technologies, this push for innovation is always accompanied by risks. In addition to the energy costs incurred by AI, the develop-

ment and use of AI are also accompanied by ethical and social risks (Crawford, 2021), which in political decision-making processes are the counterparts of economic profit. However, the extent to which policymakers take these risks seriously or address them at all depends largely on public pressure. In other words, German society will only obtain a human-oriented AI if relevant sections of society actively demand such an AI.

The media plays a special role here, since it can influence public opinion through its reporting, this being especially the case with new technologies that the public has little contact with or knowledge of (Nisbet et al., 2002; Scheufele & Lewenstein, 2005). In the past, media coverage was dominated by assumptions about

risk-based technology, as a supposed result of journalistic selection routines (Kepplinger, 1989; Peters, 1994; Sandman, Sachsman, Greenberg, & Gochfeld, 1987). However, more recent empirical studies tend to indicate that the media now adopts a predominantly neutral to positive tone with regard to a wide variety of science and technology topics (e.g. Görke, Kohring, & Ruhrmann, 2000; Hjörleifsson, Árnason, & Schei, 2008; Metag & Marcinkowski, 2014). In any case, the media sets points of reference for how and in which contexts a new technology is perceived. Of particular interest, therefore, is the perspective from which AI is reported: Is AI predominantly seen as an object of scientific debate? Or is it merely a product and instrument of business? To what extent does the media report risks such as the potential for discrimination? An overall picture of media coverage provides initial insights into how the public perceives AI, and helps us to interpret the results provided by opinion studies, such as those provided by the Opinion Monitor Artificial Intelligence (MeMo:KI, 2022).

AI as a subject of media coverage

Until the mid-2010s, AI was only a niche topic in news coverage (Fast & Horvitz, 2017). Since then, though, studies worldwide show a significant increase in media attention for the topic (e.g. Brennen, Howard, & Nielsen, 2018; Chuan, Tsai, & Cho, 2019; Fast & Horvitz, 2017; Fischer & Puschmann, 2021; Ouchchy, Coin, & Dubljević, 2020; Sun, Zhai, Shen, & Chen, 2020; Vergeer, 2020; Zeng, Chan, & Schäfer, 2020). The overall tenor of the reporting tends to be positive-optimistic and benefit-oriented (Chuan et al., 2019; Fischer & Puschmann, 2021; Fast & Horvitz, 2017; Zeng et al., 2020). In this context, it is evident that an economic perspective on AI is gaining ground, partly due to the dominance of economic actors as spokespersons in news articles (Brennen et al., 2018; Fischer & Puschmann, 2021; Vergeer, 2020; Zeng et al., 2020). Fischer and Puschmann (2021) focused on media reporting in Germany, examining for a period of 15 years (2005-2020) over 16,000 articles and contributions in leading German media and specialist blogs containing terms such as "artificial intelligence", "algorithms", or "machine learning". Using the exploratory method of topic modelling, they identified a total of 18 topics, which they then assigned to three super-categories: business (42.5%), technology (26%), and the socio-political sphere (31.5%).

The media hype of the last few years is linked in particular to the term "artificial intelligence". However, it is not always clear what AI is, and nor what methods and terms are related to it. Since the topics found in a topic modelling are particularly dependent on the composition of the sample, we focus our investigation on the media coverage of AI at a time when the hype around AI was particularly great (2018-2021), and only consider articles that have AI as their central subject. In addition, we also take into account the coverage provided by regional media. Thus, our sample represents about 56% of the total German readership for print and 37% of the total German readership for online news, and complements the findings of Fischer and Puschmann.

Methodological approach

Sample

Since the aim of our study is to say something about AI news coverage that can be considered relevant for opinion formation on the topic of AI, we selected those media outlets with the largest market share in Germany. The 2019 MediaVielfaltsMonitor produced by the state media authorities (Die Medienanstalten, 2019) serves as the basis for selecting the media outlets. We selected the top 20 print and online media outlets, these having a total market share of 56% (print) and 37% (online)[1] respectively. The sample was supplemented by articles from tagesschau.de, heute.de, rtl.de, as well as sat1.de/pro7.de (joint archive). We sampled and analyzed all news articles for the selected media for the 2018-2021 period.

Selection criteria

For the reasons mentioned above, we selected the articles that deal with AI as the main topic, i.e., the articles that contain the search terms „AI" or „Artificial Intelligence" in their title and/or in their introductory paragraph, using the search functions of the corresponding archives. The sample consists of all articles published between 1 January 2018 and 31 December 2021 for which the above criteria apply. The survey period began approximately 10 months before the German government published its AI strategy. The articles were checked for duplicates, with 520 articles being excluded, leaving a final sample of 4,968 articles. Table 1 summarizes the sample collected.

Reporting on AI over time

A glance at the number of articles published already shows that attention to the topic of AI fluctuates greatly. The data in Figure 1 are shown on a quarterly basis, with the starting-point being the months of January to March 2018, when 194 articles were published on AI.

Table 1: Sample

Media Outlet	Media Type	Number of Articles	Percentage of Total Corpus
Heise	Specialist Media (Online)	674	13.5%
FAZ	National Media (Print)	380	7.6%
Stuttgarter Zeitung	Regional Media (Print)	350	7.0%
faz.net	National Media (Online)	281	5.6%
Kölnische Rundschau / Kölner Stadt-Anzeiger	Regional Media (Print)	280	5.6%
Süddeutsche Zeitung	National Media (Print)	250	5.0%
VRM (Verlagsgruppe Rhein Main)	Regional Media (Print)	231	4.6%
WELT Online	National Media (Online)	228	4.6%
Rheinische Post	Regional Media (Print)	225	4.5%
WELT	National Media (Print)	197	4.0%
Südwest Presse	Regional Media (Print)	156	3.1%
taz	National Media (Print)	150	3.0%
Focus Online	National Media (Online)	147	3.0%
Nürnberger Nachrichten	Regional Media (Print)	134	2.7%
PC Welt	Specialist Media (Online)	127	2.5%
Rheinpfalz	Regional Media (Print)	108	2.2%
Rhein-Main-Zeitung	Regional Media (Print)	101	2.0%
Spiegel Online	National Media (Online)	100	2.0%
Mannheimer Morgen	Regional Media (Print)	87	1.7%
Computerbild	Specialist Media (Online)	87	1.7%
ZEIT Online	National Media (Online)	83	1.7%
RTL	National Media (Online)	81	1.6%
Süddeutsche Online	National Media (Online)	80	1.6%
Heute	National Media (Online)	78	1.6%
Chip	Specialist Media (Online)	71	1.4%
Stern Online	National Media (Online)	70	1.4%
BILD regional	Regional Media (Print)	63	1.3%
Giga	Specialist Media (Online)	40	0.8%
bild.de	National Media (Online)	38	0.8%
Tagesschau	National Media (Online)	28	0.6%
Netzwelt	Specialist Media (Online)	22	0.4%
BILD	National Media (Print)	20	0.4%
BILD am Sonntag	National Media (Print)	11	0.2%
pro7 / sat1	National Media (Online)	3	0.1%

The number of publications does not fall below this figure in any other quarter, which also applies to the particularly interesting segment of the national news media.

The publication of the German government's AI strategy at the end of 2018 coincided with an increase in the attention that the media gave to AI, which then peaked in the first quarter of 2019. The amount of coverage given to AI then established itself at a high level of around 350 articles per quarter. The onset of the Corona pandemic saw a significant decline in coverage of AI to around the baseline level of early 2018, before it increased again in 2021 at the time of the AI Act, reaching the level of 2019.

On the one hand, the data show that there is no guarantee that the media will give attention to the topic of AI, which is surprising given that the field of AI is full of dynamic developments, that the number of possible and actual applications of AI is increasing all the time, and that this has significant implications for individuals and society. On the other, they show how event-driven reporting on AI is. This applies in particular to regional news coverage, which shows the greatest overall fluctuation. While minimal fluctuations can be observed for the specialist media, and while the national news media also consistently gives a similar amount of space to the topic of AI, the onset of the Corona pandemic saw the number of articles in the regional daily press fall to about one fifth to one third of the peak value. When there is a particularly high level of competition among topics, the regional news

media therefore rarely provides the public with information about AI, this affecting in particular those who do not actively seek news about AI. Nevertheless, those who are more interested in AI will continue to find information in both national news and specialist media, a necessary condition for this being the interest and motivation to search actively for such articles.

Thematic contextualization of reporting on AI

In addition to the amount of coverage, we are particularly interested in the thematic contextualization of AI. Previous research has shown that AI and related technologies are treated above all as a business topic. We are interested in whether this assumption can be confirmed overall, and whether it can be confirmed for each of the three media genres equally.

To analyze the topic structure of reporting on AI, we use the method of "Topic Modelling", which is an unsupervised machine-learning approach (Günther & Quandt, 2016) in which an algorithm examines, without supervision, which words for a fixed number of k topics occur together in documents more often than average, and also calculates the proportion taken up by these word groups in individual articles. The word groups identified are then interpreted by humans and named as topics, with three steps being taken for this:

Figure 1: News reporting over time
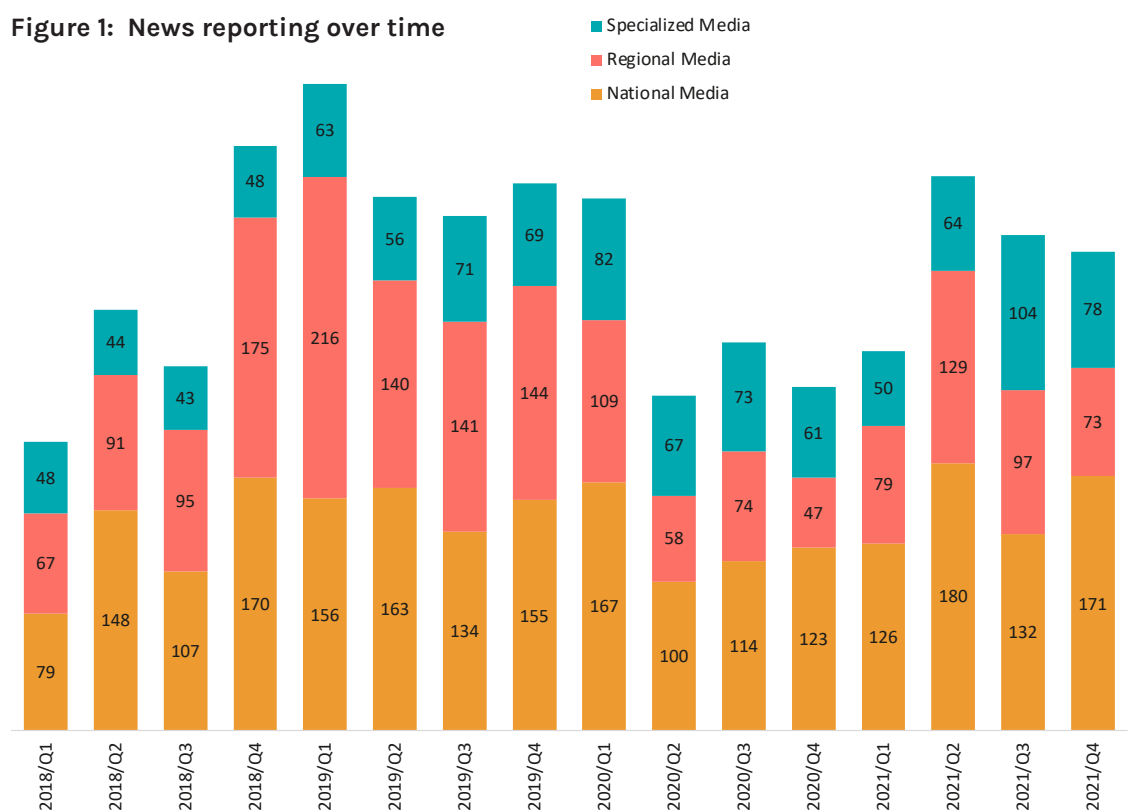
1. Evaluation of the words that are most likely to occur in a topic (Prob).

2. Review of the words that occur as exclusively as possible in a topic (FREX).

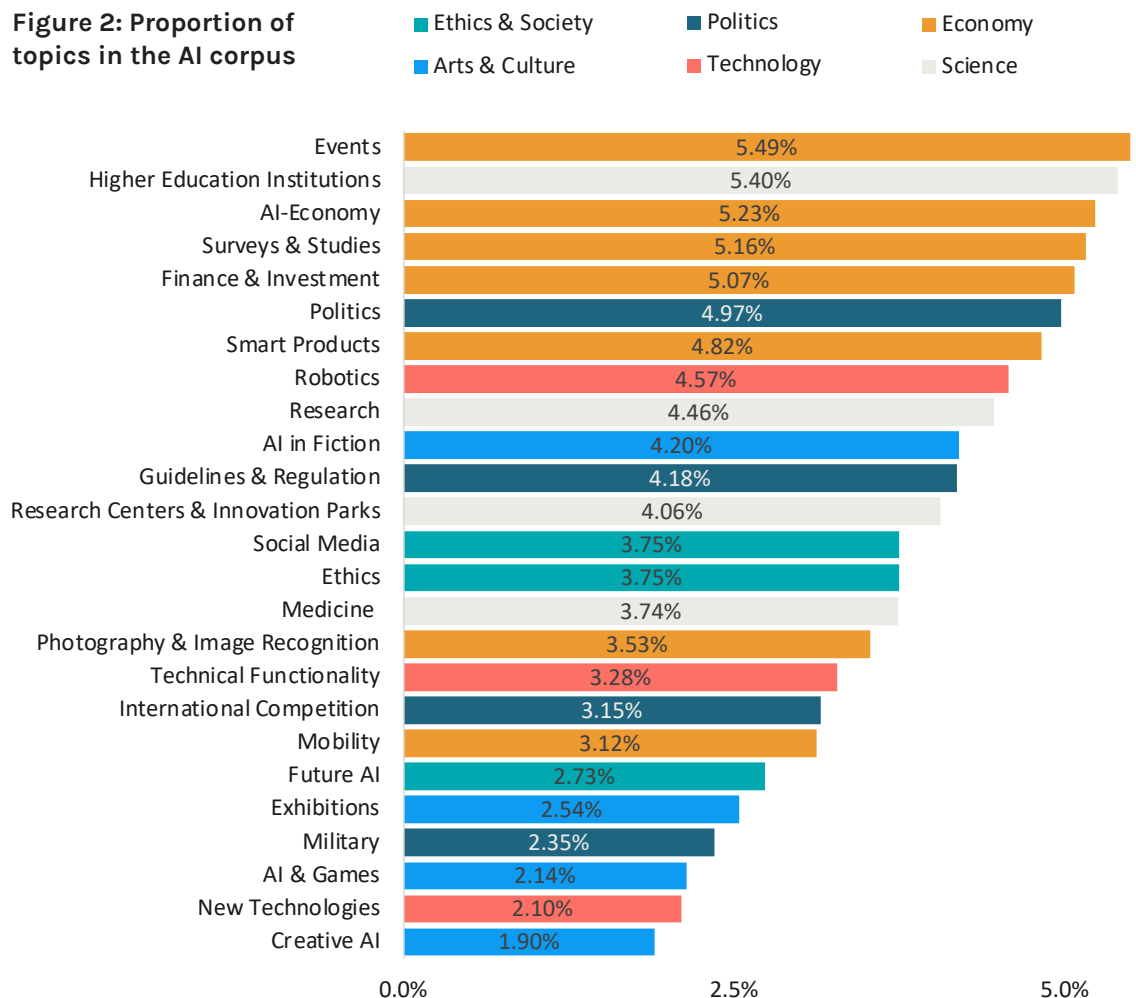3. Reading of sample articles in which a topic makes up as large a proportion as possible[2].

The most stable and interpretable solution for the present text corpus comprises $k=26$ topics. These 26 topics were named independently by two coders. Comparing the names finally led to 25 topics that could be interpreted unambiguously. Following Zeng et al. (2020), we finally assigned these to a super-category[3]. We understand these super-categories as thematic perspectives, and they represent the larger context or framework in which AI is examined. We chose for this purpose the categories economy, science, technology, ethics & society, politics, and arts & culture. We could not find in our data the category education that Zeng et al. identify. Figure 2 shows the occurrence of the topics in the text corpus, while there is a detailed description of the topics in the Appendix A1; Table A2 in the Appendix also provides key figures of the model.

Seven of the topics identified can be assigned to the economic perspective, including many of the topics that occur most frequently in the corpus. AI economic coverage is broad, ranging from trade shows and events, to corporate news from the AI industry, to the introduction of smart products.

Four topics represent the scientific perspective. The focus here is on reports about higher education institutions, mostly concerning the funding of projects that are being (or will be) carried out at German universities. Two topics (Universities and Research centres & innovation parks) deal with these issues. There is somewhat less coverage of research results

Figure 2: Proportion of topics in the AI corpus

Legend: Ethics & Society, Politics, Economy, Arts & Culture, Technology, Science

Topic	Proportion
Events	5.49%
Higher Education Institutions	5.40%
AI-Economy	5.23%
Surveys & Studies	5.16%
Finance & Investment	5.07%
Politics	4.97%
Smart Products	4.82%
Robotics	4.57%
Research	4.46%
AI in Fiction	4.20%
Guidelines & Regulation	4.18%
Research Centers & Innovation Parks	4.06%
Social Media	3.75%
Ethics	3.75%
Medicine	3.74%
Photography & Image Recognition	3.53%
Technical Functionality	3.28%
International Competition	3.15%
Mobility	3.12%
Future AI	2.73%
Exhibitions	2.54%
Military	2.35%
AI & Games	2.14%
New Technologies	2.10%
Creative AI	1.90%

[2] Data pre-processing is based on the recommendations of Maier et al. (2018).
[3] In Zeng et al. (2020), these were „economic", „educational", „entertainment", „political", „scientific" and „socio-ethical". We adapted these for the German corpus and made slight changes. Since no educational topics were discussed, this perspective is missing from our analysis. The „entertainment" perspective was renamed „arts & culture", as the German media are not exclusively about entertainment. We also decided to separate the „scientific" perspective into „science" and „technology". "Science" in the German corpus is about research institutions and direct research on and with AI. The „technology" perspective, on the other hand, is not linked to scientific research and deals with the explanation of technology from a non-research perspective.

(Research). A separate topic is devoted to AI in medicine, which deals with research results and innovations in the medical field.

The political perspective is the third most frequent, and deals in four topics with typical issues of governance, e.g. with legislation or state funding. One topic focuses on the status of the German/European AI economy in international competition as a task of economic policy, especially in relation to China and the USA. Finally, a topic in the political context is discussion of the military use of AI, this discussion focusing on the international deployment of AI and ethical concerns related to such deployment.

Ethics & society and arts & culture are covered to about the same extent. The first is covered in the topics Future AI (especially dystopias & utopias), Social media, and Ethics. All topics deal with the influence of AI on society, and with ethical questions that arise in connection with the use of AI. Articles on social media also fall into this category, insofar as they deal with ethical and moral issues to do with online platforms.

AI is also taken up in the context of art and culture, with AI not only being the subject of art and culture (e.g. in novels, films or exhibitions), but also addressed as a means of art production. The relationship of AI to humans is addressed in some topics: for example, the topics of Creative AI and AI & Games compare the capacities of humans and machines.

Finally, three topics deal with robotics, new technologies, and the technical functioning of AI, which we combine into the scientific-technical perspective on AI.

Figure 3 shows the proportion of media coverage given to each perspective over time.

It is evident that the economic perspective not only comprises the largest number of topics (diversity), but also the largest volume (intensity) of AI coverage across all media genres, something that other studies have already brought to light. However, the proportion decreased towards the third quarter of 2018, with other perspectives (e.g. politics and ethics & Society) becoming more pronounced. With the onset of the Corona pandemic and the decrease in the total number of articles devoted to AI, the economic perspective also became more important again.

The fact that the importance of the science perspective has tended to increase since 2018 can be explained by the increased funding for research projects and innovation parks since the publication of the AI strategy. The political perspective had a strong presence during the time when the AI strategy was published, and has since fluctuated over time depending on political events. Contributions on AI from an arts & culture perspective are quite variable in scope. This is partly related to the publication of fictional content about AI: when there is a new book or film with a high level of cultural and / or economic relevance, the amount of coverage is also higher. Ethical and social,

Figure 3: Proportion of media coverage given to each perspective over time.
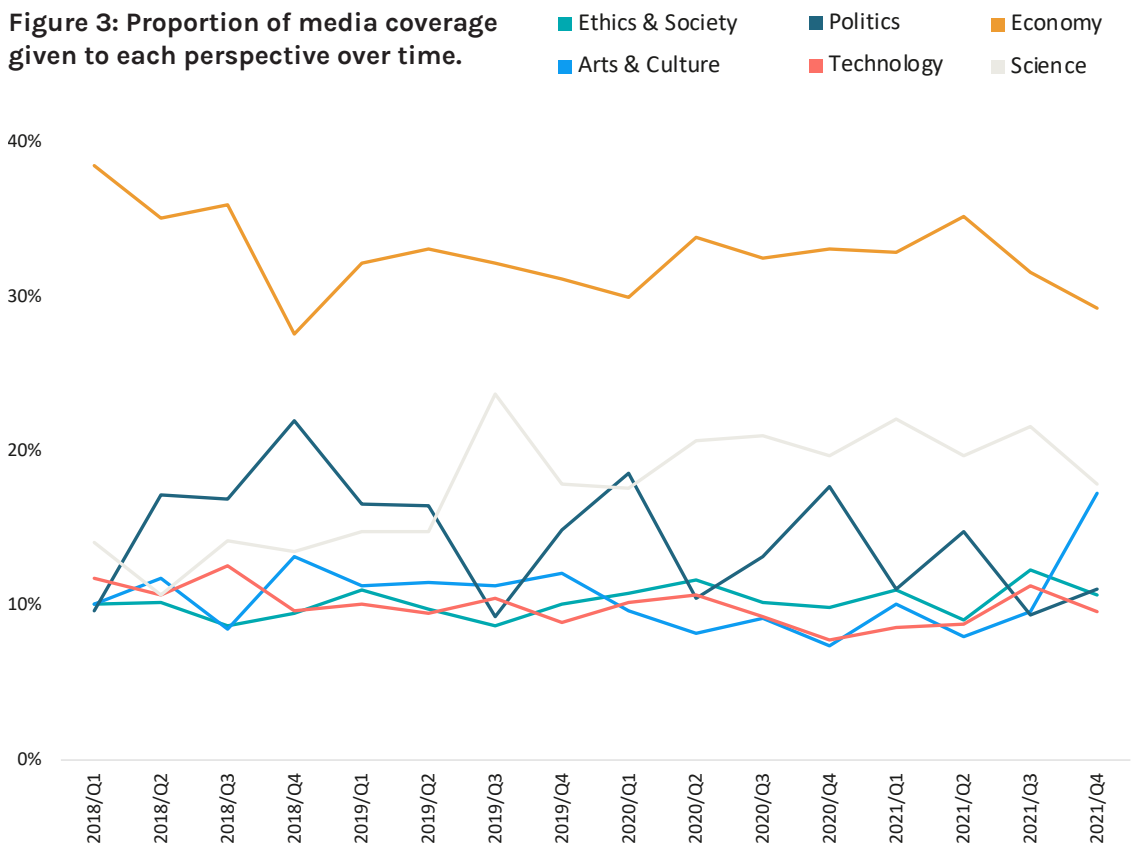
Figure 4a: Proportion of topics in the german AI corpus (national outlets).

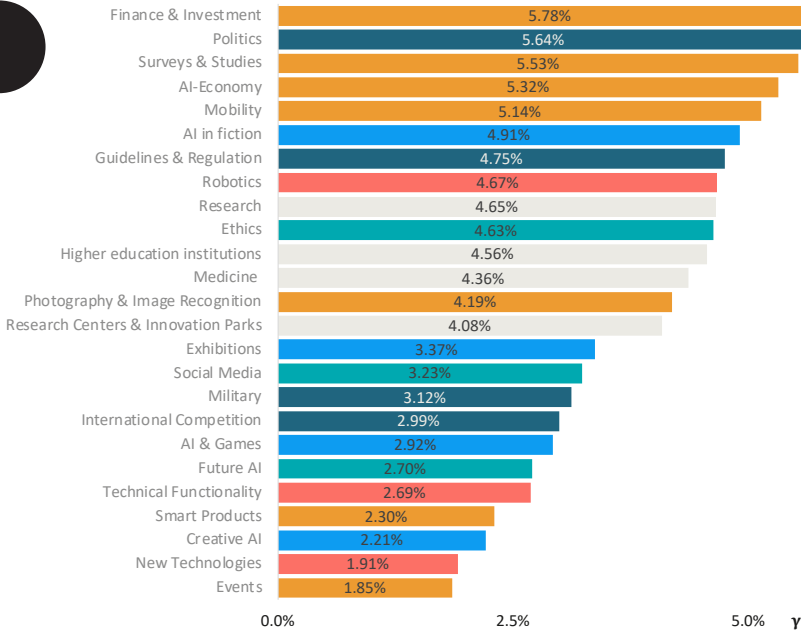| Topic	Proportion
Finance & Investment	5.78%
Politics	5.64%
Surveys & Studies	5.53%
AI-Economy	5.32%
Mobility	5.14%
AI in fiction	4.91%
Guidelines & Regulation	4.75%
Robotics	4.67%
Research	4.65%
Ethics	4.63%
Higher education institutions	4.56%
Medicine	4.36%
Photography & Image Recognition	4.19%
Research Centers & Innovation Parks	4.08%
Exhibitions	3.37%
Social Media	3.23%
Military	3.12%
International Competition	2.99%
AI & Games	2.92%
Future AI	2.70%
Technical Functionality	2.69%
Smart Products	2.30%
Creative AI	2.21%
New Technologies	1.91%
Events	1.85%

Figure 4b: Proportion of media coverage given to each perspective over time (national outlets).

Figure 5a: Proportion of topics in the german AI corpus (regional outlets).

Topic	Proportion
Events	12.52%
Higher Education Institutions	8.28%
Social Media	7.05%
Surveys & Studies	6.20%
Politics	5.72%
Robotics	5.56%
AI-Economy	5.28%
Finance & Investment	5.20%
Guidelines & Regulation	4.86%
AI in Fiction	4.70%
Future AI	3.93%
Photography & Image Recognition	3.81%
Ethics	3.27%
Military	2.83%
Exhibitions	2.71%
Research Centers & Innovation Parks	2.17%
Technical Functionality	2.00%
Mobility	1.92%
Medicine	1.77%
Smart Products	1.73%
Research	1.62%
International Competition	1.60%
AI & Games	1.47%
Creative AI	1.11%
New Technologies	0.86%

Figure 5b: Proportion of media coverage given to each perspective over time (regional outlets).

Legend:
- Ethics & Society
- Arts & Culture
- Politics
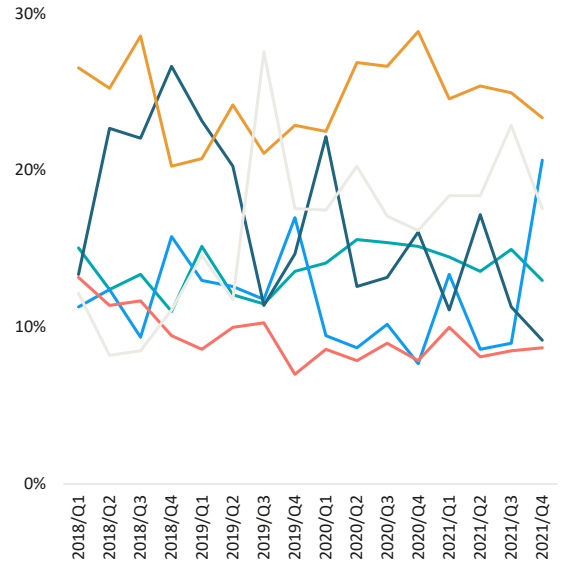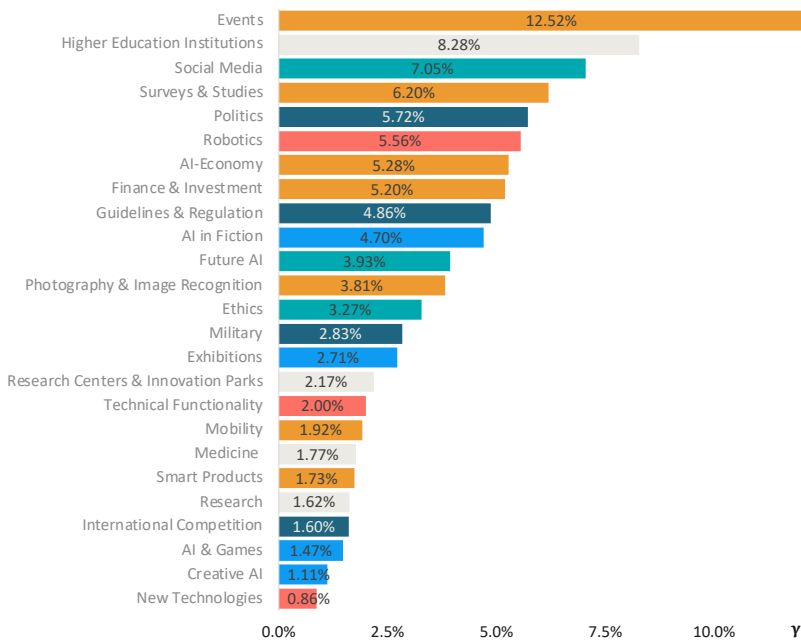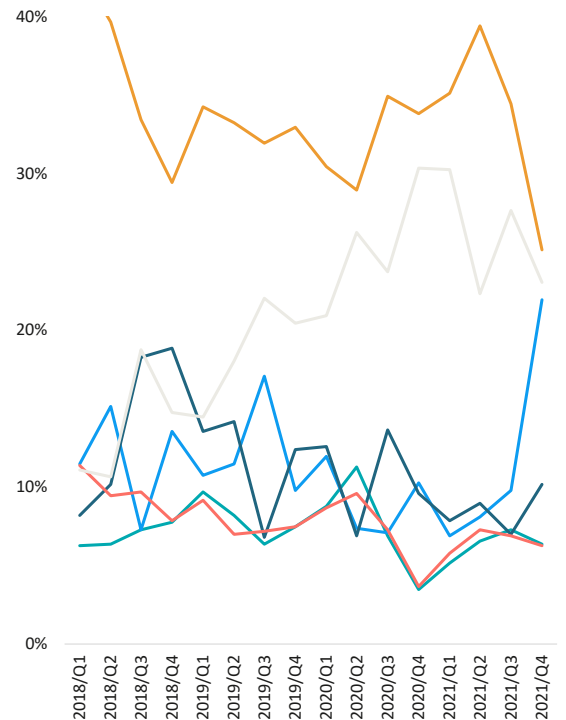- Technology
- Economy
- Science

Figure 6a: Proportion of topics in the german AI corpus (specialist outlets).

Figure 6b: Proportion of media coverage given to each perspective over time (specialist outlets).

Topic	Proportion
Smart Products	15.56%
Research	8.84%
Technical Functionality	7.97%
Research Centers & Innovation Parks	7.84%
International Competition	6.76%
Medicine	5.80%
AI-Economy	4.95%
New Technologies	4.84%
Creative AI	3.54%
Finance & Investment	3.32%
Future AI	2.68%
Robotics	2.66%
Ethics	2.65%
Photography & Image Recognition	2.64%
AI & Games	2.60%
Surveys & Studies	2.58%
Higher Education Institutions	2.32%
AI in Fiction	2.29%
Politics	2.24%
Guidelines & Regulation	1.87%
Events	1.46%
Exhibitions	1.37%
Mobility	0.87%
Military	0.80%
Social Media	0.79%

as well as technological, topics did not change their proportion significantly over the course of the survey period, always remaining present at a low level.

Differences between the media genres can be found at the level both of the individual topics and of the perspectives. Figures 4a & b, 5a & b and 6a & b show the proportions of topics per media genre and their development over time. It becomes clear that the most diverse reporting on AI takes place in national news outlets. Although reporting on AI from an economic perspective predominates here as well, proportions of more than 20% of what can be read about AI can be seen in individual quarters for other perspectives, too. However, this cannot be attributed to a single topic, since national news outlets focus in particular on topics that cut across a number of areas, such as the politics or the AI economy.

There has been a significant shift in what regional news media focus on in their coverage of AI from economic to scientific topics, with the promotion of research centres and universities especially being reasons to report on AI, since these always have a connection to the local area. For example, the southern German press gives much coverage to Cybervalley in Stuttgart. However, the regional media pay very little attention to complex topics, such as how AI functions technically or how it is politically regulated.

Perhaps surprisingly, it is the specialist media
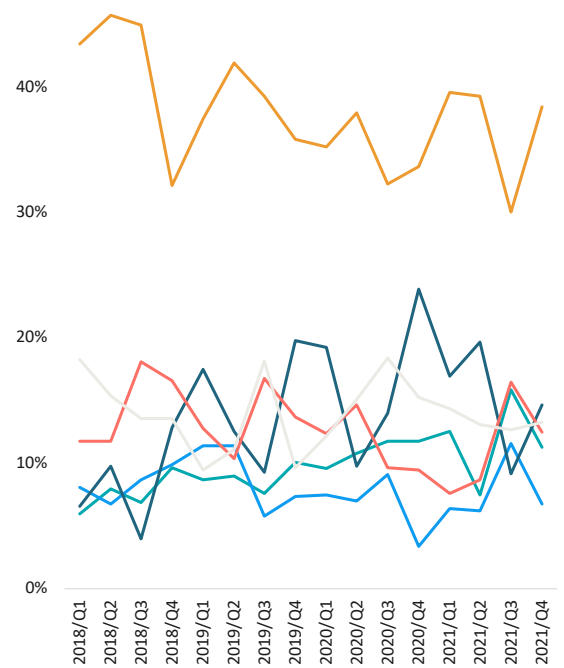
that we studied that has the strongest economic perspective on AI, its focus here being mainly on presenting new products and providing a technical explanation of how AI functions. Unlike the regional press, the specialist media also has articles on more complex topics such as research on AI and ethical approaches.

Discussion

Three key findings can be derived from the empirical analysis of media coverage of AI. First, if we go by the number of articles published over time, then coverage of AI seems to be strongly event-driven and is by no means constant. For example, the German government's AI strategy led to a significant increase in media attention; the onset of the Corona pandemic, to a clear decline; and the AI Act in spring 2021, to a clear upswing again. Second, although coverage of AI comprises different perspectives and topics, we can discern a strong economic dominance. In addition, the number of science topics increased over time, due in particular to the establishment of research centres. And, third, the first two findings can by no means be found to the same extent across all media genres, since both the quantity and the thematic orientation of reporting are influenced by the channels that end users call upon to inform themselves about AI.

What does this tell us about the public discourse? First, it tells us something about the status that journalism gives to AI. Despite the

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dynamic development of AI and the range of consequences that we can expect from its use, the number of publications is limited. Although this finding is not particularly surprising given the strong competition among topics in recent years, it does have implications for how the opinions of the general public are formed. If the media does not report on AI, then the population has no interest in AI and does not seek further information, meaning that the opinions that it has are not informed. This fact is surprising given that the AI strategy prioritizes a human-centred AI, one that involves the general public at all levels of technical development. It is the regional press, which has a wide reach, that is particularly inconsistent in its coverage of AI and that is strongly event-driven. If the press mainly reports on local technology companies or research centres, then it is barely conceivable that it will provide relevant background knowledge to do with the positive and negative consequences of AI. Such knowledge is available elsewhere to the interested audience, but only to the interested audience, and those who are not sufficiently interested will barely notice developments in AI.

Our analysis fits seamlessly into other studies on media coverage of AI, these studies showing that such coverage is predominantly economic in orientation, and tends to be positive and benefit-oriented (e.g. Brennen et al., 2018; Fischer & Puschmann, 2021; Vergeer, 2020). Findings from the last two decades have already cast doubt on the assumption that there is a technophobic or anti-technology tendency in reporting, pointing out in particular that technology and science journalists are very focused on press releases and PR activities (Brennen, Howard, & Nielsen, 2021), and often see themselves as service providers who want to educate people about new products (Geiß, Jackob, & Quiring, 2013). What has only played a subordinate role in the past four years is reporting that is potentially critical, for example when it comes to ethical questions to do with AI, political responses in the form of regulation, or scientific studies on the social implications of AI. The research perspective on AI took up an increasingly large proportion of the media coverage during the period of the study, but this coverage was mostly in the form of event-oriented reporting, for example with regard to the founding of new research centres. Surprisingly, our analysis found no educational topics discussed in the mass media, such as with regard to skills in dealing with AI and how to teach such skills. This might seem unsurprising given that the private sector has invested heavily in developing, using and disseminating AI, but which topics are taken up is a journalistic decision. Thus,

we could at least make the point that the task of reporting on AI might be to contrast the primarily benefit-oriented communication about AI with informative and perspective-expanding reporting that deals with topics not covered by the AI industry. If this does not happen, then it is highly unlikely that a strong public will exert pressure on the political domain to ensure that AI is compatible with social, democratic and environmental concerns.

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Appendix:

A1: Description of the topics

Events: This topic is about announcements or reports on AI-related events. These can be trade fairs, lectures, seminars, etc., and are usually related to the presentation of new products or the transfer of skills.

Higher Education Institutions: This topic describes AI in the context of universities. Mostly it is about funding for AI projects.

AI-Economy: This topic is about the economic use of AI, its application in various areas (e.g. agriculture), and the relationship with customers.

Surveys & Studies: This topic reports survey data on the topic of AI & digitalization. Most also have an economic connection and deal with the labour market, for example.

Finance & Investment: This topic describes reports on financial figures, but also investment in the AI sector.

Politics: This topic is about the political handling of AI. This includes statements by politicians on dealing with AI or concrete proposals for reforms.

Smart Products: This topic is about ideas for products in which AI is a relevant component. This ranges from televisions to smart home applications to digital assistants.

Robotics: This topic deals with robotics. It is about the technical description of the function as well as comparisons with human abilities.

Research: This topic is about concrete research using AI, for example for image recognition and text and language analysis.

AI in Fiction: This topic is about AI as an object of fictional content, e.g. in books, films or TV series.

Guidelines & Regulation: This topic is about the ethical handling of AI and regulatory proposals. The EU guidelines in particular should be included here.

Research Centres & Innovation Parks: This topic is about the promotion, establishment and inauguration of research centres and innovation parks. Many of these centres have a connection to Baden-Württemberg.

Ethics: This topic generally deals with ethical problems with AI. A special focus is on discrimination through algorithmic (decision-making) systems.

Social Media: This topic covers the use of AI on social media platforms as well as criticism of them, such as issues of manipulation.

Medicine: This topic is about the use of AI in medicine, e.g. in the image recognition of diseases. Both research and the application of AI in medical practice play a role here.

Photography & Image Recognition: This topic deals with AI technology in photography and image recognition. Mostly these are applications in commercial products.

Technical Functionality: This topic deals with the technical explanation of AI systems and is thus characterized by technical terms such as Deep Learning or Machine Learning.

International Competition: This topic is primarily concerned with competition with China, but also with the USA. This concerns both the economic and the political level.

Mobility: This topic discusses AI applications in the mobility sector. Above all, this concerns autonomous driving.

Future AI: This topic deals with the development of AI in the (distant) future. Mostly this is connected with discussions about dystopias or utopias, and thus deals with ethical and philosophical questions such as that of superintelligence.

Exhibitions: This topic deals with AI as the subject of (art) exhibitions, e.g. in museums.

Military: This topic is about the military use of AI. Mostly, it is about the political enforcement of AI military projects abroad (e.g. China, Russia, USA), as well as the related ethical debate around the deployment.

AI & Games: This topic describes the use of AI in games. The focus is on the well-known applications AlphaGo and chess.

New technologies: This topic is about new technologies that arise through the use of AI. Elon Musk and his ideas are particularly prominent here.

Creative AI: This topic deals with the field of creative AI. A special focus is on AI that composes music (e.g. Beethoven's 10th symphony).

A2: Overview and key figures for the topics

Label	Perspective	Top Words (Prob)	Top Words (FREX)	Percentage of total corpus	N Articles with γ >0.5	Percentage of corpus (national)	Percentage of corpus (regional)	Percentage of corpus (specialist)
Events	Economy	thema, themen, fragen, köln, veranstaltung	veranstaltung, vortrag, köln, teilnehmer, veranstaltungen	5.49%	130	1.85%	12.52%	1.46%
Higher Education Institutions	Science	universität, hochschule, forschung, dfki, neue	hochschule, dfki, kaiserslautern, uni, hochschulen	5.40%	109	4.56%	8.28%	2.32%
AI-Economy	Economy	daten, unternehmen, kunden, mitarbeiter, nutzen	kunden, produkte, kunde, mitarbeiter, service	5.23%	50	5.32%	5.28%	4.95%
Surveys & Studies	Economy	prozent, digitalisierung, unternehmen, digitale, neue	befragten, digitalisierung, transformation, messe, wandel	5.16%	79	5.53%	6.20%	2.58%
Finance & Investment	Economy	unternehmen, prozent, euro, milliarden, jahr	umsatz, dollar, fonds, investoren, start-up	5.07%	99	5.78%	5.20%	3.32%
Politics	Politics	deutschland, bundesregierung, wirtschaft, euro, cdu	altmaier, merkel, bundesregierung, ki-strategie, spd	4.97%	109	5.64%	5.72%	2.24%
Smart Products	Economy	google, microsoft, neue, alexa, amazon	lg, assistant, samsung, alexa, nvidia	4.82%	141	2.30%	1.73%	15.56%
Robotics	Technology	menschen, roboter, maschinen, mensch, maschine	roboter, maschinen, robotern, maschine, mensch	4.57%	25	4.67%	5.56%	2.66%
Research	Science	forscher, system, lernt, algorithmus, software	lernt, gpt-3, texte, forscher, university	4.46%	77	4.65%	1.62%	8.84%
AI in Fiction	Arts & Culture	leben, film, geschichte, welt, buch	film, roman, tatort, maria, leser	4.20%	85	4.91%	4.70%	2.29%
Guidelines & Regulation	Politics	eu, kommission, daten, einsatz, eu-kommission	kommission, eu-kommission, eu, regulierung, dsgvo	4.18%	119	4.75%	4.86%	1.87%
Social Media	Ethics & Society	facebook, nutzer, menschen, inhalte, internet	facebook, inhalte, instagram, twitter, politik	3.75%	55	3.23%	7.05%	0.79%
Ethics	Ethics & Society	menschen, algorithmen, entscheidungen, daten, gesellschaft	freiheit, vorurteile, ethik, entscheidungen, verantwortung	3.75%	31	4.63%	3.27%	2.55%
Medicine	Science	patienten, daten, medizin, ärzte, arzt	patienten, ärzte, rätsel, krebs, ärzten	3.74%	110	4.36%	1.77%	5.80%
Photography & Image Recognition	Economy	foto, bilder, app, software, bild	fotos, kamera, app, elefantes, gesichter	3.53%	68	4.49%	3.81%	2.54%
Technical Functionality	Technology	lernen, learning, daten, maschinelle, ai	learning, maschinelles, maschine, maschinelle, lernens	3.28%	25	2.69%	2.00%	7.97%
International Competition	Politics	welt, europa, deutschland, google, china	silicon, europa, amerika, amerikanischen, vereinigten	3.15%	18	2.99%	1.60%	6.76%
Mobility	Economy	auto, autos, auto, fahren, system	auto, autos, auto, fahrzeuge, fahrzeug	3.12%	40	5.44%	1.92%	0.87%
Future AI	Ethics & Society	menschen, leben, welt, menschliche, denken	menschheit, bewusstsein, philosophie, geist, hawking	2.73%	27	2.70%	3.93%	2.58%
Exhibitions	Arts & Culture	kunst, ausstellung, künstler, of	ausstellung, museum, sophia, künstler, theater	2.54%	55	3.37%	2.71%	1.37%
Military	Ethics & Society	china, waffen, chinesischen, entwicklung, chinesische	china, waffen, chinesischen, li, peking	2.35%	45	3.22%	2.33%	0.80%
AI & Games	Arts & Culture	spiele, spieler, spiel, spielen, spiele	spiele, go, schach, deepmind, agenten	2.14%	55	2.92%	1.47%	2.60%
New Technologies	Technology	gehirn, tesla, chips, musk, intel	chips, intel, tesla, chip, gehirn	2.10%	34	1.91%	0.86%	4.84%
Creative AI	Arts & Culture	musik, computer, beethoven, kunst, maschine	beethoven, sinfonie, beethovens, komponisten, musik	1.90%	49	2.21%	1.11%	3.54%

Note: STM with *k* = 26; covariate = media type; Initialization with "Spectral" method; Prob = Words most likely to occur in the topic; FREX = exclusive terms of the topic measured by total occurrence in the corpus; γ =topic proportion per article