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ORIGINAL ARTICLE

Defining artificial intelligence as a policy problem: A discourse network analysis from Germany

Nicole Lemke[1] | **Philipp Trein**[1] | **Frédéric Varone**[2]

[1]University of Lausanne, Lausanne, Switzerland

[2]University of Geneva, Geneva, Switzerland

Correspondence
Philipp Trein, University of Lausanne, Lausanne, Switzerland.
Email: Josefphilipp.trein@unil.ch

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Abstract

Scholars agree that digital technologies such as artificial intelligence (AI) pose a political challenge. In this article, we study empirically how different actors in the German political system define AI as a policy problem. We use an original data set of 6421 statements by representatives of political parties, interest groups, scientific experts, and public officials in parliamentary debates, government consultations, and quality newspapers. Through Discourse Network Analysis and quantitative text analyses we show that most actors define AI as technology (innovation) policy and link it to government operations, international cooperation, and macroeconomics. Although they are present, consumer protection, labor, and education seem to be less important policy issues concerning AI. The results imply that the capacity of the national government to reduce problem definition uncertainty and to steer the political agenda is difficult and that most actors focus on technological innovation rather than civil rights-related aspects.

KEYWORDS

artificial Intelligence, bureaucracies, government, interest groups, media, parliament, parties, political agenda, scientific experts

1 | INTRODUCTION

Around the world, governments are tasked with steering the accelerating digital transformation of societies and economies (Dutton, 2018; OECD.AI, 2021). This task poses substantial challenges to policy-making and public governance more widely (Taeihagh et al., 2021). Scholars have increasingly focused on the benefits and risks of artificial intelligence (AI) as one important example for the specific challenges technological innovations pose to policy-makers (Busuioc, 2021; Krafft et al., 2022; Radu, 2021; Taeihagh, 2021; Ulnicane et al., 2021). AI is a general-purpose technology, and its applications are numerous[1] and potentially affect various policy fields, such as public health (Sun & Medaglia, 2019), defense (Ku & Leroy, 2014), criminal justice (König & Wenzelburger, 2021), labor (Colombo et al., 2019), and transportation (Kouziokas, 2017). Some have argued that the use of AI could make public governance more effective (Sharma et al., 2020) and improve policy-making (Giest, 2017; Höchtl et al., 2016; Pencheva et al., 2020; Valle-Cruz, 2019). Others have pointed out that this disruptive technology also generates new ethical risks (Floridi et al., 2018) and problems for democratic governance (König & Wenzelburger, 2020; Taeihagh, 2021; Ulbricht, 2020). AI is thus different from other risk technologies, such as nuclear power, which can be addressed within a limited number of policy domains (i.e., energy and environment).

In contrast, technological innovations like AI require a broad regulatory regime (Edmondson et al., 2019) as they affect different policy issues (Buiten, 2019; Edler & Fagerberg, 2017; König, 2022; Radu, 2021; Taeihagh et al., 2021). To develop such a regulatory regime requires that decision-makers pay attention to political dynamics, which differ between policy issues and instruments (Flanagan et al., 2011; Howlett & Rayner, 2007; Ingold et al., 2017; Kammerer & Ingold, 2023; Kern et al., 2019; Stritch, 2015).

Against this background, it is important to understand the political dynamics of policy-making related to AI, notably agenda-setting and politicization, which entails researching issue attention and polarization regarding the topic by many different political actors (de Wilde et al., 2016; Feindt et al., 2021). Specifically, it is important to examine problem definition, namely, "deciding what to decide" because, "Defining and prioritizing problems helps determine which set of policy-makers have the authority to legislate and regulate" (Lewallen, 2021, p. 1035). Such clarity helps to avoid a regulatory regime that is difficult to implement (Goyal et al., 2021; Howlett & Newman, 2013; Lewallen, 2021, p. 1036).

Therefore, we need to know more about how actors define AI as a political problem, especially when it comes to defining the agenda that emerges from national AI strategies (Radu, 2021; Taeihagh et al., 2021, p. 191). Some of the previous research on AI politicization has focused on the political consequences of AI applications (König & Wenzelburger, 2021; Robinson, 2020; Ulbricht, 2020), governance and strategies (e.g., Radu, 2021; Ulnicane et al., 2021) as well as the role of narratives in agenda-setting in AI policy (Guenduez & Mettler, 2023; Schiff & Schiff, 2023). Other research has indicated that a comprehensive regulation of AI in general might be a challenge because path dependencies in different countries will shape the regulation of AI applications (Büthe et al., 2022; Nitzberg & Zysman, 2022, p. 1759). Previous research has also demonstrated that the German Ethics and Data Commission proposed a regulatory regime for Germany and the EU, which aims at protecting the population against the risks of AI that was highly influential at the European level (Justo-Hanani, 2022, pp. 147–150). The proposed EU Artificial Intelligence Act, which lays down a legal framework for the development and use of AI in conformity with EU values, identifies unacceptable risks (e.g., AI system threatening safety, livelihoods, and rights of people), high risks (e.g., AI systems in

infrastructure, education, migration, or law enforcement), and low risks (e.g., AI in videogames or spam filters) (Madiega, 2023).

In this article, we analyze the research question how different organizations define AI as a political problem, notably how they connect it to established policy issues, such as technology and government operations as well as civil rights, health, and labor. Our study examines how actors politicize AI in different political venues by conducting an in-depth empirical analysis of the discourse on AI by a variety of actors (political parties, interest groups, scientific experts, private firms, and public administrations) in Germany. We use Discourse Network Analysis (DNA) on an original data set of 6421 statements by policy actors and Quantitative Text Analysis on 4038 text documents. Our analytical approach is descriptive (Gerring, 2012) and partially exploratory (Yom, 2015), which means that our analysis is guided by clear expectations (not hypotheses) that we derive from the literature on party politics, interest groups, and bureaucratic politics.

The results demonstrate that the political parties that formed the coalition government at the time (Christian Democrats and Social Democrats) emphasize the same policy issues in the parliamentary debate which they also incorporated in the national AI strategy. Contrariwise, opposition parties highlight very different issues beyond the scope of the national AI strategy. Moreover, bureaucratic actors (ministries) made only very limited efforts to bridge different issues regarding AI beyond their core competencies. Furthermore, the traditional patterns of German neo-corporatist policy-making seem to also play an important role regarding policy-making, because business interest groups, firms and scientific actors push for a problem definition that focuses on education and domestic commerce especially.

Taken together, our results indicate that the general politicization of AI shows problem definition uncertainty regarding the different issues that actors emphasize in AI politics. The policy discourse remains highly fragmented. Our research suggests that there is little evidence of robust politicization in the form of governmental ability to steer the national political discourse. The findings indicate that path dependencies matter regarding AI politics (Nitzberg & Zysman, 2022, p. 1759) because we see signs of a coordinated approach to policy-making with many actors emphasizing different issues, which resembles consociational politics (Lijphart, 1999), a grand coalition state (Schmidt, 2008), and negative coordination between administrative departments (Mayntz & Scharpf, 1975), which is typical for German politics. Furthermore, the politics at the national level imply that actors focus strongly on innovation and economic possibilities regarding AI (see also Guenduez & Mettler, 2023) and to a lesser extent on risk avoidance related to civil rights protection.

Our research complements the findings by previous work that focuses on the European level and shows that Germany and other European governments succeeded to steer the agenda for a risk-based and encompassing AI regulation at the European level (Justo-Hanani, 2022). We point out that AI problem definition at the national level is fragmented, which might have consequences for the upcoming implementation of European AI regulations since differentiated practices might generate negative feedback effects for the positive usages of AI. This is an important problem as governments in EU members states are turning to AI to automate their service delivery systems. For example, in the Netherlands, a scandal about the hidden use of discriminating algorithms and datasets in the Childcare policy implementation showed how devastating automated systems can be without the right safeguards (Newman & Mintrom, 2023).

2 | THEORETICAL PRIORS

2.1 | Robust politicization and problem-definition uncertainty

Creating public policies for emerging technologies such as AI is a challenge for decision-makers (Lewallen, 2021; Taeihagh, 2021; Taeihagh et al., 2021). This article starts from Lewallen's (2021) notion of "problem definition uncertainty," which means that in the early stages of agenda-setting on a new policy topic (such as AI), existing problem definitions are disrupted and problem definitions for the new topic are fuzzy.

The theoretical literature on public governance has pointed out that complex policy problems require robust politicization to ensure effective policy results (e.g., Capano & Woo, 2017, pp. 411–412; Guy, 1999, p. 86; Sørensen & Ansell, 2023; Varone et al., 2013). For example, Capano and Woo (2017, p. 412) claim that robustness is a feature of the policy process in which the government can steer political agenda setting. In a similar vein, Sørensen and Ansell (2023, p. 76) suggest that a robust politicization should ensure, at the very early stage of policy-making, that "political authorities are able to maintain control over the agenda setting while facilitating distributed action." In the words of the policy design and policy formulation literature, the absence of robust politicization is likely to result into a nondesign approach to policy-making (Howlett & Mukherjee, 2017, 2018). The state's (government's) agenda-setting capacity is thus a prerequisite for the subsequent emergence of a regulatory regime according to this literature.

However, achieving this "robustness" implies a purposeful effort to develop inclusive and adaptive policy-making processes and to turn potential veto-players (i.e., actors opposed to a comprehensive AI governance model) into constructive voices. This adaptive capacity will sustain innovative institutions and policy solutions and, eventually, should allow the government to control the political agenda and modify it to reflect external disruptions (Sorensen & Ansell, 2023, p. 79). AI is a good example to study the challenges for robust politicization because it is a complex and wicked problem that affects a variety of different policy issues (Ulnicane & Aden, 2023). Furthermore, governments have multiple roles as enablers of AI development, leaders in AI Research & Development, regulators of AI applications, and end-users as well (Guenduez & Mettler, 2023; König & Wenzelburger, 2021; Ulnicane et al., 2021).

2.2 | Political competition in agenda setting and problem definition

While the discussed research on robust politicization emphasizes the importance of government's ability to steer the political agenda, policy process research has suggested that such an undertaking is difficult to achieve. Notably, scholarship on agenda-setting has emphasized that different actors, for example, political parties, interest groups, and ministries, compete to politicize new policy problems, such as AI, by linking them to existing policy issues, for example, economic affairs, health, education, or technology policy (Baumgartner et al., 2019; Baumgartner & Jones, 2010; Green-Pedersen & Walgrave, 2014; Jones & Baumgartner, 2005; Lewallen, 2021). In this process, politicization is, "... a more or less public and political affair, in particular that it is subject to an intensified public and/or political debate" (Feindt et al., 2021, pp. 5–6), which might involve many different actors and some degree of polarization between them (de Wilde et al., 2016, p. 4).

Therefore, a robust politicization of new policy issues is unlikely to appear automatically, without a deliberate effort by the government to steer the political agenda and to engage in working toward a shared problem definition (Baumgartner & Jones, 2010). Otherwise, different actors might talk past each other, which might result in uncertainty for problem-definition and regulation. In the following, we mobilize insights from the literatures on party politics, interest groups advocacy, and public administration to develop theoretical expectations regarding the politicization of AI in Germany. Specifically, we focus on how the behavior of these different actors might undermine governmental ability to steer the political agenda. We formulate open-ended expectations which complement each other to guide our empirical analysis. This theoretical approach is appropriate because our research is partially exploratory (Yom, 2015). The goal of our analysis is not to empirically attack the concept of political robustness but to understand the challenges to achieve it regarding AI-related policy-making.

2.3 | Expectations for AI politicization across actors

2.3.1 | Bureaucratic autonomy

The first challenge for robust politicization is related to bureaucratic autonomy. According to empirical research on agenda-setting, politicization is necessary to break single policy monopolies (Jones et al., 1993). In the case of transversal policy issues, such as AI, this requires coordinating different ministries and other public sector organizations that tend to seek autonomy from the head of government (Guy, 2015; Tosun & Lang, 2017). Coordinating the response to new challenges with existing public policies requires changing both laws and the practices of the administrative organs that implement these policies. Altering these practices can be a daunting task: Ideas about how to proceed with interpolicy coordination might differ across ministries and specialized public agencies (Trein, Biesbroek, et al., 2021). Furthermore, administrations might defend their turf from projects that impose new coordination practices on them, for example, by exploiting problem definition and regulatory uncertainty push their preferred issues (Candel & Biesbroek, 2016; Guy, 2015; Hustedt & Danken, 2017; Lewallen, 2021). Therefore, the integration of new policy issues into existing public policies can take place by way of a sectoral approach whereby each ministry focuses on its traditional area of expertize (Stead & Meijers, 2009), or by means of steering from the center—for example, by creating a new ministry that leads interpolicy coordination efforts (Trein & Ansell, 2021; Trein, Maggetti, et al., 2021).

We thus formulate the following two expectations concerning the role of the bureaucracy at the national level regarding the politicization of AI in Germany:

- *Expectation 1*: Ministries that had a leading role in developing the draft for the national AI strategy in Germany (e.g., Education & Research, Economy Affairs & Energy, and Labor & Social Affairs) tend to combine a larger number of policy issues compared to those ministries that had a secondary role.
- *Expectation 2*: Ministries which were not leading the draft of the national strategy will politicize AI in relation to their proper policy field (e.g., environment policy) and contribute to a fragmentation of the political agenda.

2.3.2 | Party politics

The second challenge for the ability of government to steer the agenda is related to party politics. Existing research shows that political parties have not yet attributed the same strategic importance to AI that other issues have received (König & Wenzelburger, 2019; Siewert & König, 2019, 2021). Yet, political parties are vote-, office-, and policy-seeking actors (Strom, 1990): they try to increase their chances of re-election by sending their party voters clear signals on policy issues that they own and that build the core of their electoral strategies (Bélanger & Meguid, 2008). The concept of "issue ownership" encompasses both an associative dimension, that is, voters believe that parties care most about specific issues, and a competence dimension, that is, voters judge that a particular party is the most capable of handling this issue (Walgrave et al., 2015). Existing studies highlight issue ownership's importance in explaining why voters choose one party over another (Bellucci, 2006; Green & Jennings, 2012; Lachat, 2014). Concomitantly, parties prioritize those issues in which they have a strong reputation of competence (Budge & Farlie, 1983; Dolezal et al., 2014; Petrocik, 1996). Thus, political parties have an incentive to exploit problem definition uncertainty around AI to advertise the issues they are deemed to be competent for by the electorate.

However, in multiparty government systems (like Germany), the policy priorities of parties forming the coalition in power is constrained by the coalition agreement between governing parties. This agreement lays out the policy priorities which the coalition partners intend to carry out during the term. Parties in power then loyally implement the government's agreement to maintaining the coalition cohesiveness and securing the government stability (Walgrave et al., 2006). In a similar vein, and to achieve their office- and policy-seeking objectives, governmental parties should support an official policy roadmap, which can either be formulated in a specific national policy strategy or in more general policy documents such as coalition agreements. This implies, that parties in power have less of an incentive to make use of problem definition uncertainty to push their own issues. Rather, they should be interested in advertising for the issues that the regulatory regime designed by the government includes. Thus, this literature leads us to the following expectations regarding the politicization of AI by political parties in Germany:

- *Expectation 3*: Members of the Parliament will focus on policy issues related to AI that their respective parties own.
- *Expectation 4*: Elected representatives from the governmental coalition will center their interventions around the policy issues related to AI that are prioritized in the national AI strategy.

2.3.3 | Interest group advocacy

The third challenge for robust politicization is linked to the role of interest groups. Researchers have demonstrated that diverse types of advocacy organizations tend to specialize in different institutional venues in their efforts to access the decision-making process and influence policy-makers (Buffardi et al., 2015; Hansford, 2004; Vanhala, 2009). The executive venue (e.g., consultations with stakeholders or informal meetings with stakeholders organized by the government) is known to be biased in favor of private firms and business groups. Most of the time, these economic actors defend narrow material interests, mobilize large financial

resources and personal staff, and can deliver the policy expertize that regulatory agencies seek in due time (Binderkrantz et al., 2015; Boehmke et al., 2013; Culpepper, 2010).

In contrast, citizen groups (public interest groups) seek to promote more general and ideal causes, are probably better endowed with volunteers, and are thus better able and more willing to make claims with broad public appeal (Binderkrantz et al., 2015; Dür & Mateo, 2013, p. 664; Kollman, 1998). They strategically advance their issues priorities in highly visible venues, such as the media, the judiciary, or referendum campaigns (Rothmayr Allison & Varone, 2009). If business actors and public interest groups privilege different venues, actors are likely to talk past each another, which might translate into more problem definition uncertainty, more fragmentation of the agenda, and less support for the emergence of a regulatory regime.

This "venue specialization" behavior of interest groups should however vary between countries. Germany is an emblematic case of "coordinated market-economy" and "consensus democracy," which differs from the liberal variety of capitalism and majoritarian democracies. In consensus democracies, industrial relations, vocational training, and technological innovation policy rely predominantly on neo-corporatist bargains between political elites, trade unions representatives and organized business. Such neo-corporatist arrangements encompass a pyramidal system of interest representation that allows the umbrella associations to guarantee the noncontestation of public policies by their members and, thus, to engage in a "political exchange" with public authorities; a permanent and institutionalized consultation of the economic peak-level organizations that crystallizes and reinforces this political exchange; and a consensual decision making mode (Hall & Soskice, 2001; Lehmbruch, 1977; Lijphart, 1999; Siaroff, 1999). In the case of AI, we can expect that a regulatory regime emerges in the Germany context that could be labeled "AI corporatism" (cf. Filgueiras, 2022). Regarding the role of interest groups, we propose the following expectations concerning the politicization of AI in Germany:

- *Expectation 5*: Umbrella trade unions and business organizations will actively participate, in a coordinated fashion, to the definition of key AI-related labor, domestic commerce and education issues since neo-corporatist negotiations and arrangements are the rule in these policy domains.
- *Expectation 6*: Citizen (public) interest groups are more likely to appeal to a wider public and thus to focus on issues, such as environment or civil rights rather than technology and economic issues.

Our expectations suggest that the bureaucracy itself, political parties, and interest groups might limit the robustness of AI politicization. If actors talk past each another this might translate into limited control of the political agenda by government, more problem definition- and regulatory uncertainty (Taeihagh et al., 2021, p. 1013). In the following, we explore empirically, to what extent different types of actors talk about the same issues when it comes to AI policy in Germany.

3 | RESEARCH DESIGN, DATA, AND METHODS

Our empirical focal point is Germany's national strategy on AI (*KI-Strategie der Bundesregierung*), which was established in November 2018 and seeks to develop a "framework for a holistic policy on the future development and application of AI and generative AI in Germany." It is a

pivotal policy document that establishes AI-related policy goals for different policy subsystems, which makes it a suitable case study to explore the politicization of AI.[2] Many countries have published similar strategies to formulate a policy agenda for AI (Guenduez & Mettler, 2023). We focus on Germany because it is an important EU member state and successfully shaping EU AI policy (Justo-Hanani, 2022), and therefore a relevant case to understand the politicization of AI at the national level. We use additional data to cover the period between 2017 and 2019 (1 year before and 1 year after Germany implemented its national AI Strategy) (cf. below).

3.1 | Operationalization

We focus our analysis on actors (political parties, interest groups, firms, scientific actors, and government actors) and policy issues mentioned in relation to the debate on AI. We coded issues following the policy categories defined in the context of the *Comparative Agendas Project*[3] (CAP), which have been adopted by comparative public policy research around the world (Baumgartner et al., 2019). The coding categories are the same as Lewallen (2021, p. 1041). Concretely, we compare which policy issues different actors emphasize in different venues of the political discourse, for example, newspaper articles, parliamentary debates, and in a governmental consultation focusing on AI policy. The online Supporting Information contain a list of the actor categories and policy issues that we use in our analysis.

3.2 | Data sources and analysis

3.2.1 | Data sources

We use three different data sources to analyze AI's politicization in German political discourse (Table 1) as well as the national AI strategy document.

(1) To analyze the debate that took place in the *federal parliament*, we included all 88 parliamentary debate protocols of the *Bundestag* (the lower chamber of the federal parliament) that mentioned "Künstliche Intelligenz" [Artificial Intelligence] and

TABLE 1 Overview of the data and its sources.

Venue	Parliamentary debate	Government consultation	Newspaper debate
Quantitative Text Analysis	356 debate interventions	817 comments by policy stakeholders	2865 articles from "Frankfurter Allgemeine Zeitung" and "Süddeutsche Zeitung"
Time	November 2017–November 2019	End of autumn 2018	November 2017–November 2019
Discourse Network Analysis	2081 coded statements	3762 coded statements	578 coded statements (from 281 randomly selected articles)

"Algorithm*" between November 2017 and November 2019, 12 months before and 12 months after the national strategy on AI was passed. From these protocols we extracted 356 debate interventions by elected representatives that clearly referred to AI (again using "Künstliche Intelligenz" [Artificial Intelligence] as key word).

(2) The data for our analysis of the *newspaper* debate on the issue of AI covers the same period as the parliamentary debate. We focus on two quality newspapers: the *Frankfurter Allgemeine Zeitung* and the *Süddeutsche Zeitung*. We downloaded all 2865 articles using the key words "Künstliche Intelligenz" [Artificial Intelligence] and "Algorithm*" from the newspapers' online archives for the period in question (November 2017–November 2019).

(3) The analysis of the *government consultation* includes 817 documents from the public consultation held by the federal government before the national strategy was put into place (the consultation ended in the autumn of 2018). These documents are comments made by political stakeholders on various parts of the national strategy. Such consultation procedures are common in Germany (and in other advanced democracies, as well as at the level of the European Union). Their purpose is to gather the input of different stakeholders, such as private firms, business interest groups, or nongovernmental organizations, on new policy initiatives. Occasionally, political parties and representatives of some subnational governments also participate in these consultation procedures. A consultation's goal is to assess whether a proposed policy solution is feasible (can be implemented by state and private actors) and acceptable (can be supported by most of the actors involved) before the new policy is adopted.

For our Quantitative Text Analysis, we used the entire data set of 4038 text documents (356 parliamentary debate interventions, 2865 newspaper articles, and 817 stakeholder statements). For our DNAs, we manually coded[4] the parliamentary debate intervention protocols, stakeholder comments and a random selection of 281 newspaper articles. This analysis resulted in 2081 coded statements from the parliamentary debate, 3762 coded statements from the government consultation and 578 coded statements from the newspaper debate (Table 1).

3.2.2 | Methods

Our methodological strategy combines two methods of text analysis. We first conducted a Quantitative Text Analysis on the total number of text documents we retrieved, using the *quanteda* package for the statistics software R (Benoit et al., 2018). We used the CAP code manual to employ a dictionary-based word search for the different CAP code policy issues. This allowed us to analyze the frequency with which terms referring to these policy issues were mentioned in the documents from different venues. The code for the dictionary analysis can be found in the Online Supporting Information.

We also conducted a DNA: We performed a categorical content analysis using the Discourse Network Analyzer (DNA, version 2.0 beta 25) software (Leifeld, 2017) on the parliamentary debate intervention protocols, stakeholder comments and a random selection of newspaper articles. This included carefully reading the text documents and manually coding text fragments of "statements" made by political actors. Concretely, we coded the following variables: The name of the individual who issued a statement, their organization's name, the type of their organization, the policy issue they refer to, and the date of their statement (for

newspaper and parliamentary debates) (cf. Online Supporting Information for the detailed procedure).

3.2.3 | Visualization of results from the DNA

We used the Visone software, version 2.16 (Brandes & Wagner, 2004), in a two-mode network approach (Agneessens & Everett, 2013; Borgatti & Everett, 1997) to picture the link between actors and issues. Specifically, we visualize two-mode networks of actor-issue relations, in which the first set of nodes represents the CAP-coded issues, while the second represents either individual organizational actors or groups of organizational actors, such as scientific or public actors. The edges connecting them represent actors referring to issues in the political debate in different venues. All our networks are visualized using the numeric backbone layout in Visone (Brandes & Wagner, 2004) highlighting the edges with the highest weights. This form of visualization allows us to illustrate which actors most strongly politicize which issues in the German political debate on AI.

We corrected the network data for potential biases before visualization: First, we removed duplicate referrals to the same CAP issue in the same text document, that is, parliamentary debate intervention, newspaper article, stakeholder comment. This ensures that actors' emphasis of issues is not distorted by rhetorical or writing styles. Second, we used actors' average activity (cf. Leifeld et al., 2018) to normalize the edge weights in the newspaper and parliament networks. We did so to correct for both a potential media bias that would allow some actors more public visibility than others (Leifeld, 2017) and the German parliament's institutional rules, which affect party parliamentary groups' visibility. We did not normalize our consultation data in the same way, because actors could decide whether to participate or not and how long and comprehensive their comments would be within the limits of the consultation's formal structure, which were the same for everyone (Kukkonen & Ylä-Anttila, 2020; Leifeld, 2017, p. 312). Further information regarding the methodological approach and the preprocessing of the network data can be found in the Online Supporting Information.

4 | RESULTS

We present the empirical findings in two steps. First, the quantitative text analysis shows how issues attention varies between the chancellery and main ministries that drafted the German AI strategy versus the policy actors which politicize in the print media debate, the parliamentary debate, and in the consultation. Second, we focus on specific venues of debate to assess whether the actors-based expectations are supported by empirical evidence.

4.1 | Issue priorities for AI in the national strategy versus in political debates

The results of our dictionary-based quantitative text analysis show that the focus of the discourse on AI strongly varies across policy issues and across political debates (in parliament, governmental consultation, and newspapers) in comparison to the adopted national AI strategy. The findings reveal that actors in the different venues emphasize diverse policy issues.

Notably, technology seems to be most prominent in newspapers' discourse and in the governmental consultation, whereas actors in parliament focus on government operations and international cooperation, as well as civil rights, labor, and education. In addition to technological innovation, the participants in the government consultation also emphasis health, civil rights, labor, and international cooperation (Figure 1).

An analysis of the diversity of the issues debated in the three venues and the national strategy (which, like most analyses of political agendas, is based on entropy scores; see Jennings et al., 2011; Tresch et al., 2013) confirms that actors in each venue as well as the national strategy covered a broad spectrum of issues (Figure 1).[5] Furthermore, correlational analyses between the relative political attention dedicated to the CAP issue categories in the different venue of debates clearly indicate that the patterns of politicization differ systematically across venues and from the main issues that the government emphasized in the national AI strategy.[6]

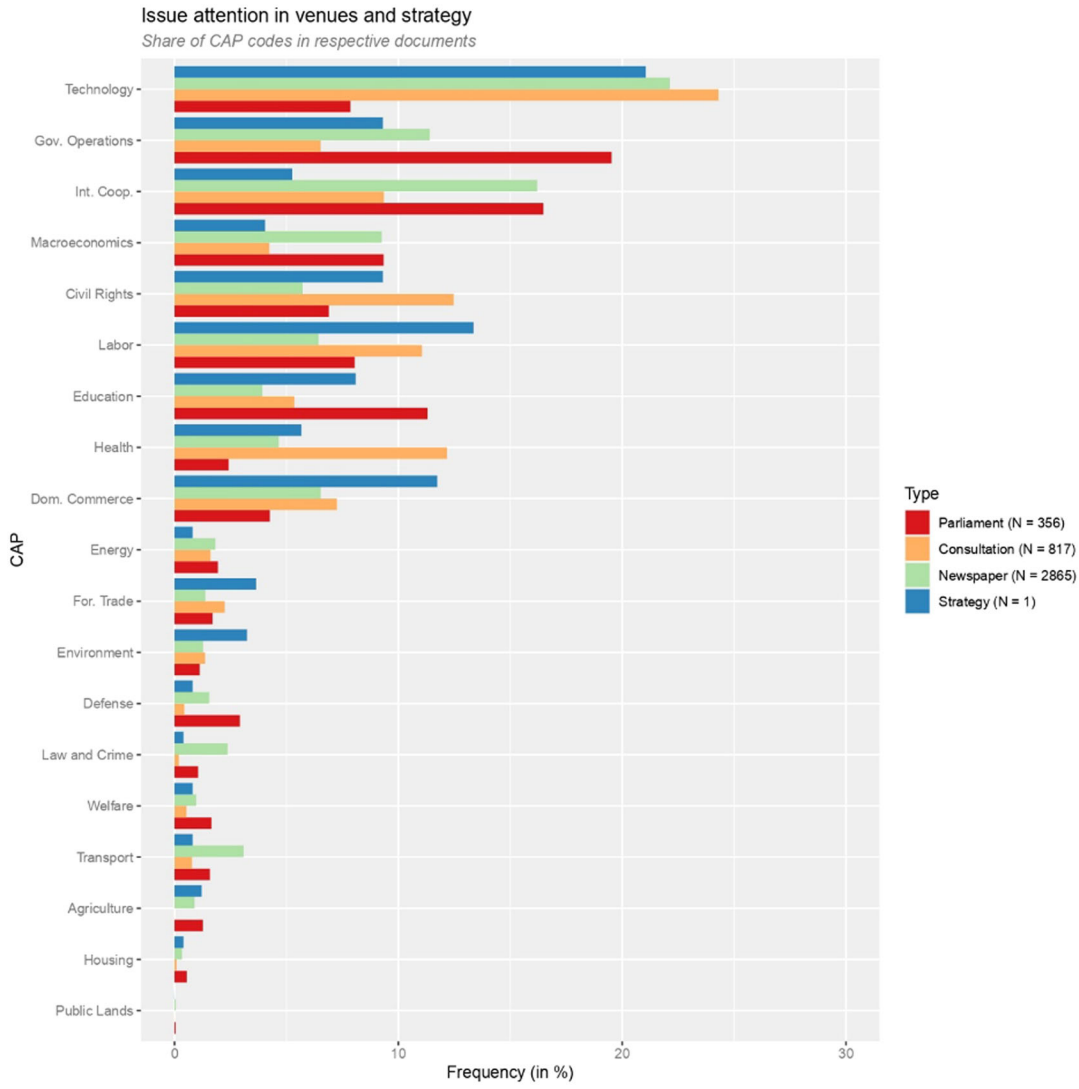


FIGURE 1 Relative attention to policy issues across venues and the national artificial intelligence strategy.

The differences that we observe across venues likely reflect the different strategies of actors in coping with and/or exploiting problem definition uncertainty, which is typical for the early stage of policy-making on an emerging technology such as AI. Thus—at the time of analysis—there is little evidence for robust politicization.

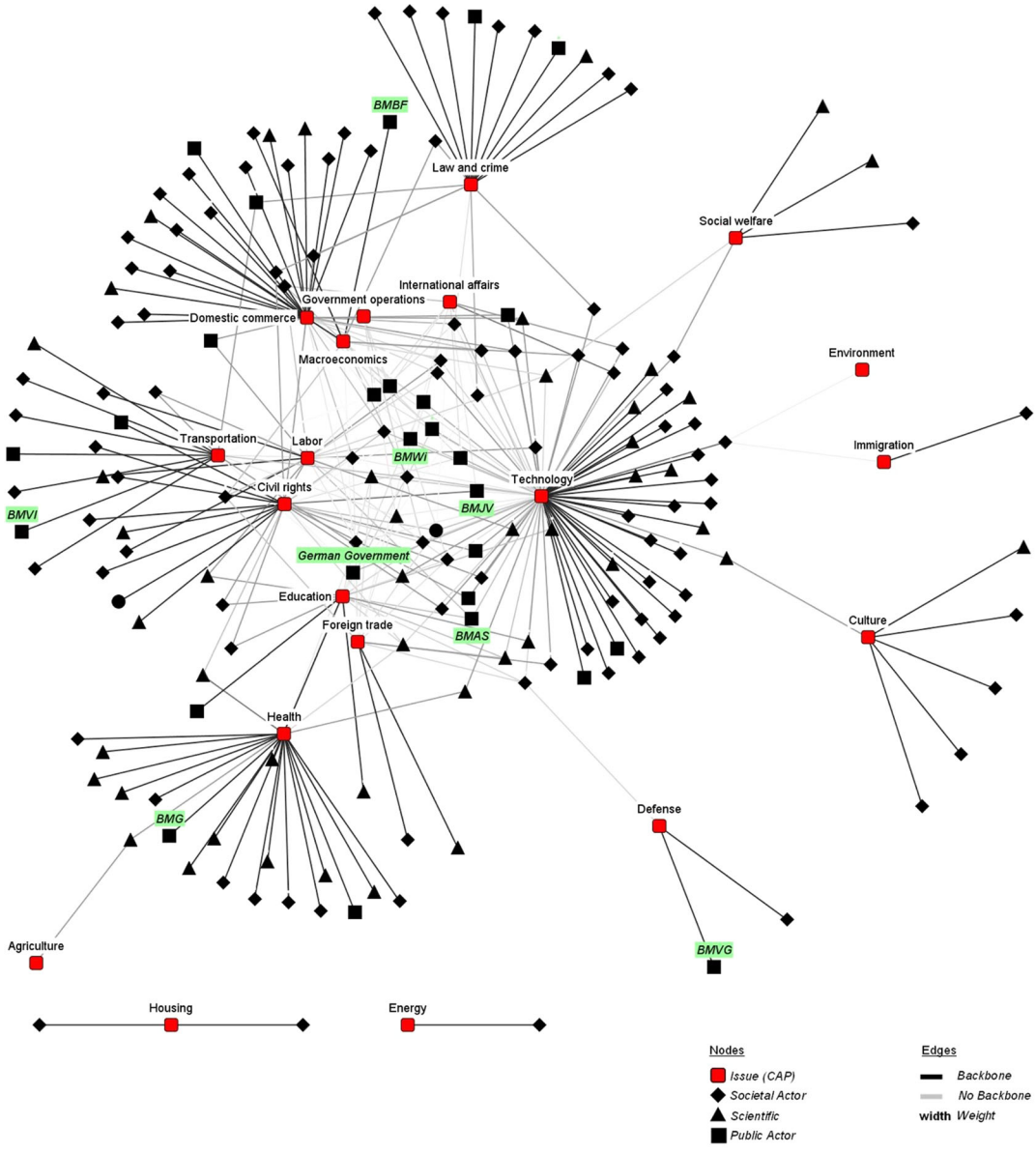
An important insight from this quantitative text analysis in this regard is that issue prioritization in the national strategy is different compared to issue priorities in the various debate venues, especially regarding the importance of Labor and Domestic Commerce (Figure 1).[7] It seems that not all the issues preferred by the head of government and leading ministries figure equally prominently in different venues of political debate. This result casts doubt on the question of government's ability to steer the debate and to ensure a "robust" politicization of AI in Germany. It rather seems that the differences we observe across venues reflect the different strategies of actors, which we explore in the following sections.

4.2 | Bureaucratic fragmentation

To analyze how bureaucratic actors politicize AI, we focus on the newspaper discourse since ministries are not invited to talk in the parliamentary debate and not visible in the government consultation. Consequently, the only venue in which policy statements of all ministries can be captured empirically is the print media debate. As mentioned above, we calculate the backbone ties for the network, which allows us to distinguish loose and tight ties between issues and actors. If a ministry has a backbone tie with one specific issue, this finding is a sign for a rather narrow focus of AI issue definition. If other important actors have different backbones this indicates fragmentation (Nocaj et al., 2015).[8]

Figure 2 shows that various ministries focus largely on specific policy issues concerning AI (e.g., they have a black backbone tie with one issue). For example, the Federal Ministry of Health (BMG) focused exclusively on health policy; the Federal Ministry of Transportation and Infrastructure (BMVI) focused exclusively on transportation policy; and the Federal Ministry of Justice and Consumer Protection (BMJV) mostly focused on civil rights. In contrast, the Head of Government (Chancellery), the Federal Ministry for Labor and Social Affairs (BMAS), and the Federal Ministry for Economic Affairs (BMWi) actively connected the technology-oriented debate around AI to other policy fields, such as labor, macroeconomics, and international affairs.

These results provide limited support to our Expectation 1, that Ministries with a leading role in developing the national AI strategy tend to combine a larger number of policy issues: This appears to be true for the Ministry for Labor and Social Affairs (BMAS) and for the Ministry of Economic Affairs (BMWI), which both occupy—in the two-mode network depicted in Figure 2—a brokering position between technology and several other policy issues. In sharp contrast, the Federal Ministry for Education and Research (BMBF) is astonishingly mostly interested in macroeconomic issues. Our Expectation 2 suggests that the German bureaucracy has a rather sector-specific focus when it comes to AI, unless ministries are explicitly involved in formulating the national AI strategy. Overall, the results thus support our second expectation about limited interpolicy coordination in the discourse on AI-related policy issues and a potential sectorization in AI's integration with existing policy fields. To some extent, this fragmented problem definition is a conscious choice of the governing Christian Democrats/Social Democrats coalition: it chose to handle digital topics, such as AI, through each ministry's responsibilities. The opposition parties, among which the Liberal Party was most vocal (see



Two-mode network (newspaper data): Numeric backbone layout. Red nodes are policy issues. Black nodes are actors. Societal actors are depicted as diamonds, scientific actors are depicted as triangles, public actors are depicted as rectangles. German federal ministries are highlighted in green. Black ties are backbones, other ties are grey. Edge width depends on edge weight.

FIGURE 2 Two-mode actor-issue network from newspaper debate.

Figure 3 below), and the Greens, demanded greater coordination, advocating for a digital ministry, which would have corresponded to a "central regulator" in an emerging regulatory regime.

These findings show that in the case of AI, politicization between ministries shows some of the negative side effects of Germany's consensus democracy, namely that policy coordination

between ministries can be difficult unless the head of government takes a strong leading role (Braun, 2008; Mayntz & Scharpf, 1975; Radtke et al., 2016). Our results indicate such a lack of leadership and support our expectations that some bureaucratic actors advance their own issues at the expense of robust politicization and, a shared problem definition.

Further, the "Chameleon pluralism" (Coen & Katsaitis, 2013) we observe in the newspaper debate may pose a potential danger if different configurations of the sector-specific actors' network and media echo chambers eventually lead to isolated policies and a differentiated implementation of policies on AI. This situation might further undermine interpolicy coordination and, consequently, the development of a regulatory regime for AI (Bolognesi & Nahrath, 2020; Cejudo & Michel, 2017), because different departments will interpret the German strategy on AI very differently. The risk of a fragmentation of the agenda is still very high since the revision of the national AI strategy that occurred in December 2020, was mainly conducted in light of the COVID-19-pandemic. It focused on an economic stimulus package (e.g., increase of the German AI budget until 2025 by 2 billion Euros) but not as much on how to better coordinate the policy agenda related to AI.[9]

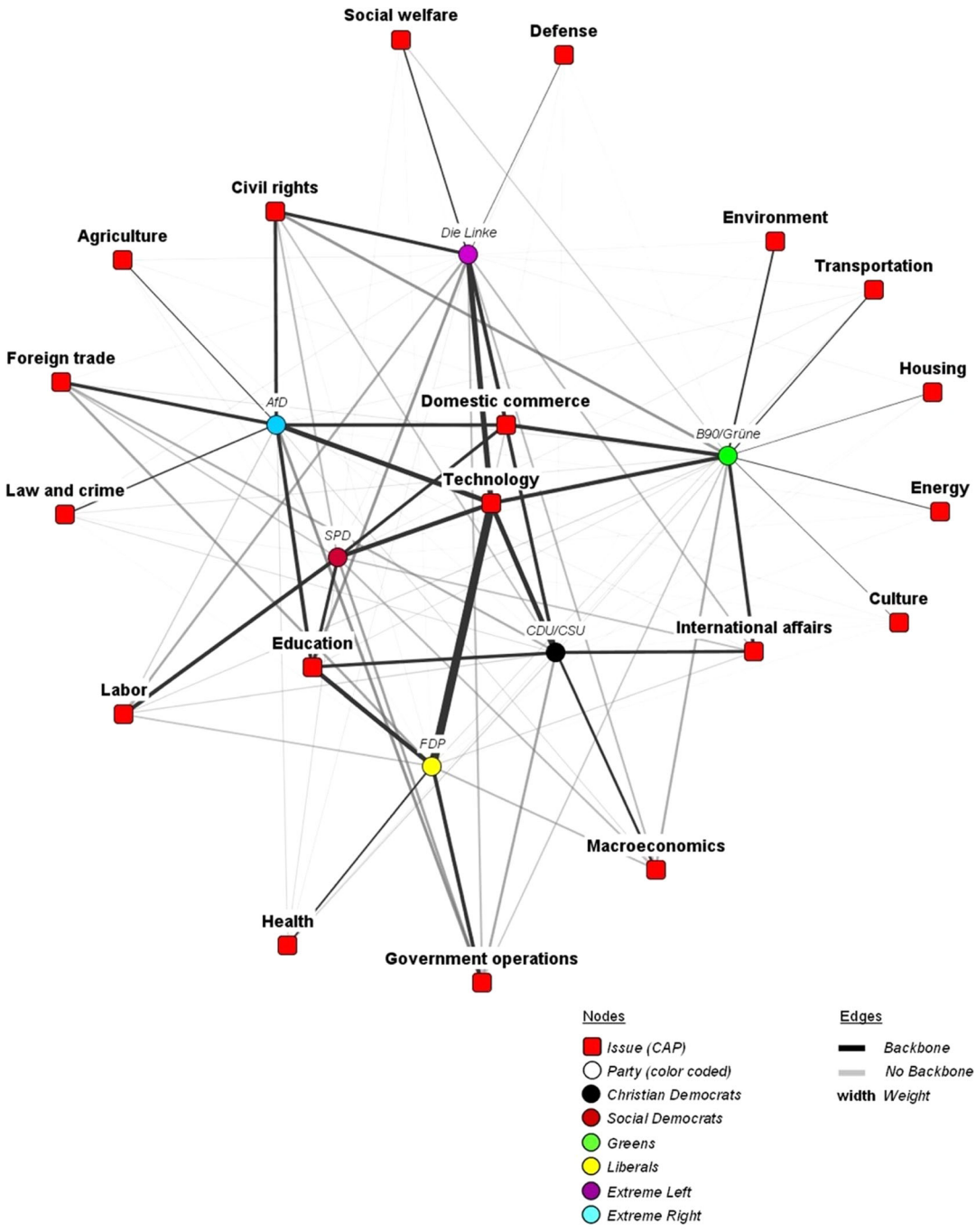
Overall, the analysis of the policy discourse in the news media arena highlights the fragmentation of politicization into different silos and government actors' limited role in the development of substantive interpolicy coordination strategies. Bureaucratic actors defaulted to their established logic of action and advanced their own issues of interest.

4.3 | Party politics as usual

This section analyzes issue ownership at the party level through politicians' interventions in the German parliamentary debates on AI. Again, we build on the backbone method to interpret the findings from the discourse network analysis. Figure 3 clearly indicates that parliamentarians from all political parties emphasize strong ties between technology and AI (see the "Technology" category at the center of the graph) as well as between domestic commerce and AI. Nevertheless, each party has strong ties to different issues regarding AI and public policy, in addition to technology and domestic commerce. For instance, the Green party (*Bündnis 90/Die Grünen*) has strong ties regarding AI in policy issues related to environmental protection, transportation, and international affairs (e.g., EU relations). In contrast, the extreme right *Alternative für Deutschland* (AFD) puts a selective emphasis on the issues of law and crime—a topic emblematic of and owned by right-wing populist parties—as well as civil rights and foreign trade. Elected representatives from the extreme left party (*Die Linke*) report strong ties between civil rights and social welfare issues (Figure 3). The Liberals (*FDP*) emphasize strong ties between AI and government operations, education, and health.

Concerning the two parties in government—the Christian-Democratic and Christian-Social parties (*CDU/CSU*) as well as the Social Democratic Party (*SPD*)—the findings show that the representatives of these two parties express strong ties regarding AI and technology and domestic commerce, like the other parties. In addition, the *SPD* parliamentarians express strong ties of AI to labor and education whereas the CDU/CSU has strong ties to education, international affairs, and macroeconomics.

The results also show that the distribution of policy priorities varies across parties. As formulated in Expectation 3, opposition parties focus on AI applications in the policy domains at the core of their ideological programs. If we look at the backbone ties in the network, we find



Two-mode network (parliament data): Numeric backbone layout. Red nodes are policy issues. Circular nodes are actors. Parties are color coded: Christian Democrats are black, Social Democrats are dark red, Greens are green, Liberals are yellow, extreme Left is violet and extreme right is turquoise. Black ties are backbones, other ties are grey. Edge width depends on edge weight.

FIGURE 3 Two-mode actors-issues network for the parliamentary venue.

that *FDP, Linke*, and *AfD* connect AI to core topics of their program, which contributes to the fragmentation of the policy discourse on the matter.

As far as agenda-setting is concerned, our results suggest that the two parties that governed during the selected period—the Christian Democrats and the Social Democrats—linked technological innovation policy most strongly to education and domestic commerce. As expected theoretically (Expectation 4), this is congruent with the priorities set in the national strategy on AI that they adopted. In contrast, the environment, transportation, housing, and energy policy were barely relevant to the policy issues prioritized by the two governing parties.

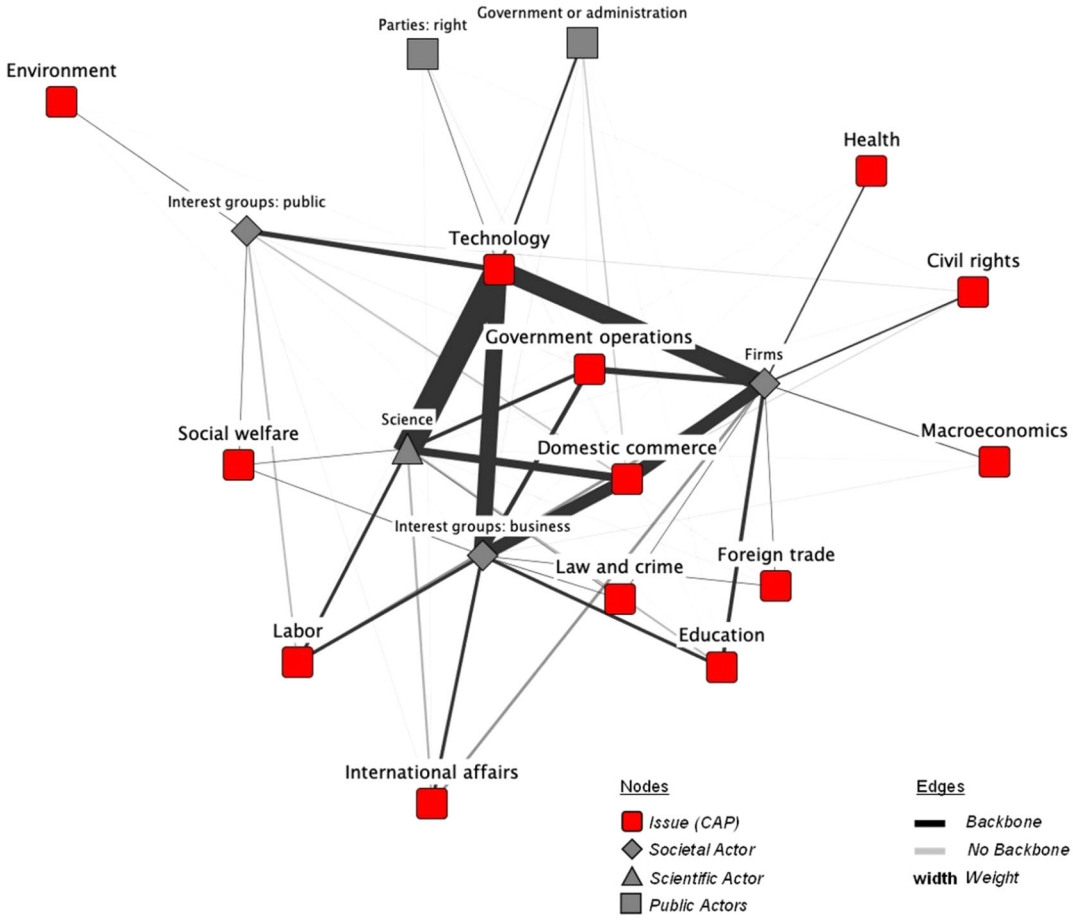
These strong differences between the political attention that political parties dedicate to diverse policy domains strongly reflect the classical divide in parties' priorities and issues' ownership, as well as the opposition between the majority and the opposition. Therefore, party politics tend to increase the level of "problem definition uncertainty." By contrast, the cohesiveness of the two governing parties, who emphasize during the parliamentary debates the issues building the core of the national AI strategy, should reduce the fragmentation of the agenda.

4.4 | Neo-corporatist arrangements

Figure 4 presents the actors-issues network for the government consultation on the German AI strategy. The results show that the network has strong backbone ties connecting technology, government operations and domestic commerce each with firms, business interest groups, and science actors. Further backbones show strong ties of public interest groups and technology, education with firms and business interest groups as well as labor market policy with scientific actors and business interest groups. These findings imply the following. First, both private firms and business groups are more active within this discourse network than citizen groups. Second, we do not observe a strong opposition between business groups and citizen groups, even though both camps highlight applications of AI in the labor market and in the social welfare system. However, most of the time, business, and citizen groups seem to talk past one another, since they focused their respective attention on different policy domains. Regarding the most emphasized policy issues, the triangle of business interest groups, firms, and scientific actors linked technological innovation to domestic commerce, and business interest groups and firms shared a strong concern about education policy. Furthermore, scientific actors also mostly focused on the link between technology and economic policy.

Unsurprisingly, this triangle of actors (i.e., scientists, firms, and business groups) reflects the historically developed logic (Streeck & Thelen, 2005) of German policy on research and innovation, which has traditionally been characterized by a "state interventionist and corporatist approach" (Lang et al., 2012, p. 290) with a focus on industrial policy and competitiveness (Weyer & Schneider, 2012). More recently, German digital policy has also seen a turn toward a greater focus on the topics of productivity, efficacy, and the economic use of digitalization (König, 2018, 2019).[10]

It should be highlighted that the findings based on the consultation data are largely corroborated by a recent study published by Guenduez and Mettler (2023): the authors combined structural topic modeling and qualitative narrative analysis to identify the most prevalent policy narrative in 33 countries (based on AI policy documents published as of April 2021). They concluded that the most prevalent AI policy narrative in Germany is "engaging in strategic collaboration for AI Research and Development." The narrative indicates that industry, academia, and government should make collective effort toward developing an AI



Two-mode network (consultation data): Numeric backbone layout. Red nodes are policy issues. Grey nodes are actors. Societal actors are depicted as diamonds, scientific actors are depicted as triangles, public actors are depicted as rectangles. Black ties are backbones, other ties are grey. Edge width depends on edge weight.

FIGURE 4 Two-mode actors-issues network for government consultation.

ecosystem and foster innovation. This conclusion, which is also based on the alternative data analysis, confirms our own finding which is presented in Figure 4.

In addition, the significant presence of academic experts in the government consultation procedure (Figure 4) indicates a moderate degree of political conflict, at least at this stage of the politicization process. Previous studies inform us that the use and credibility of academic expertize are higher on less controversial issues (Radaelli, 1999; Schrefler, 2010; Weible, 2008). In other words, the "quiet politics" nature of a government consultation procedure does not only privilege business interests, but scientific experts as well. These findings suggest that business interest groups and firms tend to be more present in neo-corporatist settings such as the consultation and that these actors probably choose this venue over the newspaper debate. Nevertheless, the results also show that scientific actors play an important role in neo-corporatist arrangements, which is a point that we did not emphasize in our expectations.[11]

Finally, we have also conducted a longitudinal analysis for the newspaper arena and the parliamentary venues to assess whether a convergence of issue priorities occurs over time. The findings suggest that the agendas of the parliament and the print media converged over time

(i.e., between November 2018 and November 2019) (Lemke et al., 2023). Nevertheless, the temporary analysis covers a limited period only.

5 | CONCLUSIONS

In this article, we explore the definition of AI as a political problem, comparing the German strategy on Artificial Intelligence—as adopted by the Federal government in November 2018—to the political discourses in news media, parliamentary debates, and government consultation between 2017 and 2019. Since AI is a general-purpose technology, its concrete applications concern many different policy domains. The comparison of actors' discourses—that is, parties, ministries, interest groups and scientists—reveals that the political agenda on AI regulation remains highly fragmented. Our results demonstrate that actors in these different venues focus on various policy issues when politicizing AI.

Our research shows that governing parties have mainly aimed their policy discourse on education and domestic commerce, and this focus was reflected in the national AI strategy. Their approach is contested by the opposition, highlighting the policy issues they traditionally "own." Furthermore, interpolicy coordination between different ministries regarding AI seems limited at the time the research was conducted. Instead, different departments mainly focus on issues in their area of competence. Neo-corporatist arrangements of interest group inclusion seem to be important, as firms, business interest groups, and scientific actors voice rather similar positions regarding the problem definition of AI as an innovation issue that requires a strong investment in research and development.

Such a fragmentation of the policy discourse might challenge the government's ability to steer the political agenda. This situation bears the risk of differentiated usages of AI in public policy between jurisdictions and policy fields, for example, different uses of facial recognition. Furthermore, the silent (i.e., nonpoliticized) AI transformation of specific policy domains and service delivery may be problematic. Such "hidden uses" of AI-tools such as discriminating algorithms and datasets may lead to public scandal as illustrated by the Dutch scandal in Childcare policy (Newman & Mintrom, 2023).

This study contributes to the literature on a new policy area, such as disruptive technology, in the following ways. First, we illustrate the preconditions for robust politicization, that is, governmental ability to steer the agenda (Capano & Woo, 2017; Sørensen & Ansell, 2023), regarding AI in Germany. We demonstrate how party politics, interest group inclusion, and bureaucratic politics have the potential to fragment agenda-setting and to potentially increase uncertainty of problem-definition. This fragmentation of the policy discourse might also have consequences for the subsequent policy design and implementation.

Second, this article shows empirically that AI is indeed a wicked policy issue that links to very different existing policy fields (Ulnicane & Aden, 2023). We illustrate how various actors make this connection between established policy fields and AI. Our findings also indicate that technology remains an important problem in the framing of AI since most actors connect AI as a technical problem to other policy issues. This result chimes with the finding by scholars who recently emphasize the importance of narratives in agenda-setting related to AI (e.g., Guenduez & Mettler, 2023; Schiff & Schiff, 2023).

Third, our findings complement studies on AI multilevel regulation. Scholars have emphasized the presence of AI regulation at the European level (König, 2022) and shown that the German government was able to steer the agenda for a risk-oriented (civil-rights protection) AI regulation at

the European level together with other countries (Justo-Hanani, 2022). Our study suggests that there is however a fragmentation of AI politicization at the national level, which potentially will affect the upcoming policy implementation of the EU Act on AI. Recent developments concerning digital policy in Germany support this interpretation. The national government that was elected to office in 2021 failed to form a shared policy agenda regarding AI at the time of writing. Instead, different ministries still advance their proper policy projects, such as the Ministry of Justice (Rusch, 2022). Although this article focuses on Germany as a case of AI corporatism (Filgueiras, 2022), the main challenge our analysis reveals—how to include a variety of actors and different policy issues into AI governance—is also a problem in other political systems, where governments seemingly have more control over the political agenda (Douglas et al., 2020).

Our work opens the door for future research endeavors. First, additional scholarship should deepen the understanding of emerging policy communities related to AI because this will help our understanding of challenges regarding policy implementation. Therefore, authors could focus on theories such as the Programmatic Action Framework and the policy implementation literature (e.g., Bandelow & Hornung, 2022; Hornung et al., 2019; Sager & Thomann, 2017; Sager et al., 2014). Second, a promising avenue for future research comes down to how political actors can link different aspects of AI applications into a regulatory regime that combines diverse policy issues and instruments (Lemke et al., 2023). Therefore, scholars could also examine the effective management of politicization (Schimmelfennig, 2020). Third, future research could explore the diffusion of policy issues between countries, such as Germany and the United States (Gilardi et al., 2021). Despite the Greens' and the Liberals' calls for a digital ministry, the current coalition agreement[12] does not foresee the creation of such an institution. However, whether this indicates early patterns of path dependency in Germany's digital and AI policy-making remains a question for future research. AI policy-making and the design of policy mixes for AI, in Germany and beyond, have likely just begun.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

ORCID

Nicole Lemke http://orcid.org/0000-0002-8085-4713
Philipp Trein http://orcid.org/0000-0001-6217-6675
Frédéric Varone http://orcid.org/0000-0002-5620-3291

ENDNOTES

[1] For example: autonomous vehicles, facial or voice recognition, automation of administrative tasks such as fraud detection, or medical diagnostic.

[2] Federal government of Germany [https://www.ki-strategie-deutschland.de/home.html], last access, November 28, 2023.

[3] See https://www.comparativeagendas.net/. The project is the same as the Policy Agendas Project (PAP).

[4] The precise coding procedure is outlined in Section 3.2.2 and the Online Supporting Information.

[5] We calculated Shannon's H for each arena and the results are as follows: newspapers: 2.44; parliament: 2.46; consultation: 2.31; strategy: 2.43. Higher entropy scores indicate that political attention is more equally distributed between many policy domains (i.e., Elected representatives address more policy issues than actors present in the media and stakeholders participating in the governmental consultation) (Evans, 2020).

[6] We calculated Kendall's and Spearman's rank correlation coefficients for the issues in different venues/documents (Consultation, Media, Parliament, and the National AI strategy). The overall comparison shows that venue type including the actors that politicize in it and the ranking of issues are related. In other words, CAP codes are ranked differently in the venues we are interested in. This finding supports our interpretation that there are systematic differences between the venues regarding the ranking of different policy issues. The pairwise comparison of different venues confirms this finding.

[7] Note, that from a temporal perspective the debate in parliament and newspaper covers one year before and one year after the national strategy in November 2018, while the consultation covers roughly the same moment in time as the national strategy. The correlation coefficients between the issues mentioned in the strategy and the other venues is as follows: consultation 0.9, newspaper discourse 0.77, federal parliament 0.51.

[8] Definition of the backbone layout: "The method is based on a spanning subgraph that is sparse but connected and consists of strong ties holding together communities. Strong ties are identified using a structural measure of embeddedness": [Visone Wiki] https://visone.ethz.ch/wiki/index.php/Backbone_Layout, accessed on November 28, 2023.

[9] More information about the update of the German federal governments updated national AI strategy can be found here: https://www.bmwi.de/Redaktion/DE/Pressemitteilungen/2020/12/20201202-kabinett-beschliesst-fortschreibung-ki-strategie-bundesregierung.html, last access: November 28, 2023.

[10] cf. The updated German strategy on Artificial Intelligence: Federal Government of Germany [https://www.ki-strategie-deutschland.de/home.html], accessed in August 2022.

[11] We do not have the data to test whether business interest groups and firms are more active in government consultations and that public interest groups focus their activity on the media debate. Future research should examine this research question.

[12] Mehr Fortschritt wagen—Bündnis für Freiheit, Gerechtigkeit und Nachhaltigkeit. Koalitionsvertrag 2021–2025 zwischen SPD, Bündnis 90/Die Grünen und FDP. See https://www.spd.de/koalitionsvertrag2021/.

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AUTHOR BIOGRAPHIES

Nicole Lemke conducts public policy research at the University of Lausanne in Switzerland. Her research focuses on innovation and technology policy, particularly in artificial intelligence policy and governance. For her doctoral dissertation, she examines how organizations seeking to shape emerging AI policy deal with the associated technological and political uncertainty. She holds master's degrees from the University of Konstanz and from Sciences Po Grenoble.

Philipp Trein is Assistant Professor in Public Administration and Policy at the IEP (Institute of Political Studies) of the University of Lausanne and a Senior Fellow at the IES (Institute of European Studies) at UC Berkeley. His research interests cover comparative public policy and administration, digitalization, health policy, social policy as well as multilevel governance and federalism. The results of his work are published in leading journals of political science (e.g., *European Journal of Political Research, West European Politics*), public administration

(e.g., *Public Administration Review, Governance*), and public policy (e.g., *Journal of European Public Policy, Policy Sciences*). His latest research project deals with the integration of artificial intelligence into public policy. More information can be found here: https://people.unil.ch/josefphilipptrein/.

Frédéric Varone is Professor of Political Science at the University of Geneva. He also holds an elective mandate as deputy magistrate at the Geneva Court of Auditors (2019–2024). Trained as an economist and political scientist, his teaching and research interests focus on comparative policy analysis, public sector reform, program evaluation, interest group strategies, and the behavior of elected politicians. He co-authored with Michael Hill the eighth edition of "The Public Policy Process," published with Routledge.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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