Online-Networks of Challengers in Food Policy: A comparative Study of Structures and Coalitions in Germany, UK, US and Switzerland

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Abstract
In our study we assume that the latency of food safety policy making renders the issue an ideal case to study the mobilization by challenger organization through the Internet. By analyzing online issue networks in the field of food safety in the UK, the US, Germany and Switzerland we seek to reveal food safety issue networks in the Internet and determine the dominant actors and coalitions. We describe how do they relate to each other in their communication and what the role of traditional media is in the mobilization of food safety contention. In our study we compare the structure of food safety networks in pluralist and corporatist democracy, as we take Germany and Switzerland as examples of corporatist systems while the UK and the US in contrast stand for pluralist systems. Our empirical findings relate to hyperlink networks which we construct on the basis of webcrawls with the Issuecrawler, a hyperlink crawling software. The findings are instructive with respect to the role of the Internet in agenda building of food safety, as in countries where the issue is confined into national political interest groups arrangements the mobilization is triggered only by expert and transnational communication from outside. In countries where challengers do not find support within national policy arrangements their Internet communication uses the traditional media to bring food safety questions onto the public agenda.
Introduction

On January 25, 2013 the New York Times introduced Sarah Kavanagh who is a 15 year old high school student from Mississippi whose favorite drink is Gatorade\(^1\). She had learned from a friend that it contains brominated vegetable oil which is proven to cause health risks. Sarah was outraged. She went on the change.org website and launched a petition, which was signed by 200.000 supporters within a few days. As a reaction, the producer of Gatorade, Pepsi Cola, changed the recipe of the drink. The company had reacted extremely fast after the petition gained pace and after the issue was picked up by the media. The Center for Science in the Public Interest, a public advocacy group in the food and public health sector rooted in Washington said that they had been fighting for the removal of brominated vegetable oil for “the last several decades” (Strom, 2013) and nothing had changed. For years, the US regulatory office, the Food and Drug Administration (F.D.A.), had held the situation in a limbo and the industry had done nothing until Sarah Kavanagh took action.

The case of Gatorade relates directly to the study presented in this paper, as it shows in a nutshell the process through which issues of food safety may be mobilized on the Internet: Outrage of consumers leads to action on the Internet, the online campaign spills over into the (online) media and builds up pressure on the industry. In the political sphere such a case may eventually result in changes of regulation, prescriptions of food production or ingredients. For social science research the Gatorade case raises the question whether it represents a typical process pattern of agenda building or what the conditions are under which food safety becomes an issue of wider public debate and potentially of political action. In our study, we focus on the structures and coalitions of challengers in the food safety sector which emerge on the Internet and their relations to the mass media in different national political contexts such as Germany, UK, US and Switzerland. Our research questions are (1) How do food safety issue networks on the Internet look like from a structural perspective, what are the dominant actors and coalitions and how do they relate to each other in their communication? (2) What is the role of traditional media in the food safety coalitions and in what way are they conducive to the career of the issue? (3) How does the structure of food safety networks vary in different political contexts and what does this mean for the mobilization and politicization of the issue?

We argue that in food safety policy, the interlinking patterns of challengers’ communication on the Internet are an essential trigger for mobilizing the issue and set it on the media and political agenda. However, the patterns of communication and coalitions vary depending on the national context and also on the role of the media in reaction to online communication. Our study aims to measure and to compare the online hyperlink networks in four European countries and tries to assess the conditions of a broad public debate on food safety in Germany, Switzerland, the UK and the US and eventual political action.

The paper proceeds in three steps: In the first section we discuss the nature of food safety as political issue and then set up the theoretical framework of the study which is rooted in agenda building research. We focus in particular on the role of the media in processes of mobilization and on the role of hyperlink networks therein. Our empirical study seeks to answer how the issue networks in food safety and the role of the media therein varies and how different patterns of democracy such as pluralist or consociational types of decision making impacts on agenda building. In the third part we

introduce the methods and the findings of a hyperlink network analysis of challengers’ communication in the four countries under study which we interpret as opportunity structure of mobilization of food protest.

I Food Safety as Issue of public debate and political contention

There is wide agreement in science that food safety has become an important issue: Adverse effects of industrial mass production, contamination and genetic manipulation of food are acknowledged to be urgent problems (Lien, 2004) while the concrete regulation of production standards and limit values of ingredients remain rather technical and therefore less salient topics. While there is no doubt about the significance of food safety issues, apart from scandals and symbolic politics, the policies of food regulation have been less present in public debate. Food policies seem to remain in the arena of negotiations between the food industry and the health regulation bureaucracy.

While food safety has been an unobtrusive issue on the daily agenda of traditional mass media (cit), in the movement sector there has been activism with respect to the observation of health risks and production modes connected to food. The activists in the issue field claim that the solution to food safety problems involves a radical, costly shift of our way of food production, distribution and sale. The challengers are largely based in civil society, and the food production and distribution industry is their main target of contention. Compared to other fields of contentious politics, the causes of food safety appear more scattered and fragmented. As a result, food safety is not a coherent but a diverse issue and therefore not part of the everyday political debate, although food scandals endanger individual and public health. This leads us to expect that food issues are negotiated somewhere at the periphery of the political arena. At the same time they do have a potential to evoke public contention. It is therefore pressing to research the conditions of mobilization of the issue.

Our study concentrates on the networked communication on the Internet and its potential to eventually mobilize challenger organizations in food policy. Challengers are defined by Kriesi (2004, p. 196) as “actors who do not have routine access to the decision-making arena or to the established media”. Recent social movement studies suggest that challengers become active in public communication thereby using online and traditional media to sponsor their issues to the level of political decision making (Chadwick, 2006, p. 134ff). We assume that the latency of the food safety issue renders it an ideal case to study the communication and the online coalitions of challengers and their potential to induce political action in different political environments. We expect that under the condition of a pluralist democracy, issue networks in online communication build on a dense structure linked with other protest movements and therefore allow better chances for the mobilization of the food safety issue than in consensual systems. Since we assume that the mobilization of food safety strongly depends on processes of communication, the theoretical framework our study draws on the literature on agenda building and also on the research on hyperlink networks.

II Theoretical Framework

Mobilization of issues in the light of agenda building research

The analytical framework of our study is derived from agenda building research in mass communication (Nisbeth, 2008) and political science (Cobb, 1981; Wolfe, Jones, & Baumgartner, 2013) which allows social scientists to study the processes by which demands of various groups in the
population are translated into items on the (a) political agenda, (b) media agenda and (c) public agenda (R. Cobb, Ross, & Ross, 1976; Denham, 2010). Approaches of political agenda building allow to investigate the “processes by which groups attempt to move issues from their own agendas to those of policymakers” (Denham, 2010, p. 308) thereby exploiting the communication infrastructure.

Political agenda building by challengers of established politics can be described relating to the outside initiative model by Cobb et al. (1976, p. 127f) that denotes activities from non-governmental groups to influence first the public agenda and eventually the “formal” agenda of political decision making. For this model, Cobb et al. (1976, p. 127f) postulate that a new issue first denotes a general grievance shared by individuals and groups who eventually initiate agenda building. In the second phase the concern is translated into specific political demands. The third stage of expansion is most critical because outside groups need to create sufficient salience to attract the attention of decision makers: “Typically this is done by expanding an issue to new groups in the population and by linking the issue with pre-existing ones” (R. Cobb, et al., 1976, p. 128). The transfer of the issue crucially depends on whether new supporting groups join the issue coalition. Also, struggles over agenda-control may start out since not all new groups necessarily agree with the specification of the original claim. In this phase, the issue arrives on the media agenda and draws the attention of the general public. The final stage represents the spill over from the media agenda to the political agenda which still depends on the backing of its supporters. The outside initiative model informs our study since it allows for comparative research across countries and media (R. Cobb, et al., 1976, p. 137). Moreover, it allows to conceptualize and research different stages of agenda building. Our study focuses on the expansion phase in particular when challengers seek to find allies in mobilizing their claims.

**Online issue networks as starting points of mobilization**

This paper concentrates on challengers and their networked online communication as sources of outside issue initiation. We assume that the channel of large scale media representation is largely closed for challengers, whereas online media offer alternative avenues for civil society and movement actors to draw attention to their claims (Chadwick, 2006, p. 116f). Current research focuses on the analysis of linking patterns and networks of social movement organizations on the Internet (Diani, 2000), which has led to concepts such as “online social movements” (Ackland & O'Neil, 2011, p. 177) or “connective action” (Bennett & Segerberg, 2012). In the issue areas of our study, online communication has become a viable means of communication in food risk questions, since challengers depend to a large degree on the possibilities of the Internet (Kleinschmit, 2010; Rutsaert, et al., 2013).

Advocacy in challenger communication plays out in online issue networks which are technically represented in the interlinking structure of challengers’ websites. Online issue networks are defined as “web pages that are connected by hyperlinks and that all treat a particular issue” (Marres, 2005, p. 97). Hyperlinks are essential structural elements of online-based communication (Jackson, 1997; Park, 2003; Thelwall, 2006). They are set intentionally (Shumate, 2012) to direct users from one website to another and consequently guide their behaviour of information seeking. From the perspective of the communicator, hyperlinks are instances of communicative integration of actors that are relevant within the thematic context of that specific hyperlink (Zimmermann, 2006). Hyperlinks can be interpreted as a proxy for (a) real world social movement activism (Carpenter & Betsy, 2012) and (b) “for partnerships and alliances between organizations, and even international

Studies on online issue networks qualify their nature and structure in three points. First, the structure of online issue networks in the political blogosphere is driven by political leanings insofar as networks share partisan ideologies (Adamic & Glance, 2005; Meraz, 2009, 2011; Tremayne, Zheng, Lee, & Jeong, 2006). Wallsten (2007; 2011) demonstrates that the ideological bias also plays out in the referencing of blogs by traditional media.

Second, online issue networks are characterized by the diversity of actors within these networks. (Shumate, 2012). Rogers (2010) maintains that small organizations use the links to indicate that they wish to associate with larger organizations for funding or support of their claim. Shumate (2012) found that challenger online networks are also penetrated by other organizational actors who seek to link with them in order to shape public discourse, including governments, corporations, other NGOs and traditional media. As retention and selection mechanisms are working in hyperlink networks, NGOs have a clear preference for other popular websites of NGOs in the same issue network and change their hyperlinks frequently. However, they cannot avoid actors from other sectors in society to link with them. Even if an online issue network is been kicked off by a challenger it is most likely that established actors such as corporations or political parties or traditional mass media sooner or later appear in the network and in the same breath influence the career of the issue.

Finally, online issue networks adhere to the power-law principle which means that few sites within an issue area draw the most attention (Meraz, 2009: 685). In the meantime a number of studies demonstrate that the Internet is by no means an open and equally accessible space that is free from power asymmetries (Gerhards & Schäfer, 2010; Zimmermann, 2007). Quite the contrary seems to be the case, since in the political blogosphere a few actors “gain disproportionate influence and attention” (Meraz, 2009, p. 685).

In the political agenda building literature it is still taken for granted that the established media are the main “battleground” (Castells, 2008, p. 85) of NGO campaigns and also “a key player in expanding the scope of an issue by acting as an alternative venue used by issue advocates inside and outside the institutions of government” (Wolfe, et al., 2013, p. 182). Thus, the larger mobilization of issues by traditional mass media is still a condition sine qua non. At the same time, online communication has altered media agenda building since new communication venues and practices interfere with mainstream media’s agenda building and presumably also impact on political agenda building. In order to study these processes the relation between old and new media must be re-assessed (Haas, 2005). In this paper, we take a special focus on the involvement of online-outlets of traditional news media within the issue networks under study.

**Comparative Perspective on online issue networks**

Comparative research on political agenda building emphasizes that national political contexts are critical to the process (Soroka, 2002; Van Noiije, Kleinnijenhuis, & Oegema, 2008; Walgrave & van Aelst, 2006). National differences relate to the political context, namely the type of democracy, the institutional rules and governance of a country, the political configuration and how a country
organizes political responsibility (Walgrave & van Aelst, 2006). One must also take into account how a country has organized decision making and responsibility within specific policy fields and how it deals with stakeholder participation and regulation.

The countries of our study represent different constraints of policy making and public debate. That allows us to formulate expectations regarding the position of challengers and their coalition building in food networks. In the current analysis we focus on the type of democracy which is thought to influence agenda building with respect to potentially contentious issues and also the role the media play. The type of democracy relates to the differentiation of Lijphart (1999) between pluralist and corporatist democracies. We suppose that the conflictual vs. consensual mode of governance in each type of democracy plays out in communication and structure of coalition building. We expect that challengers in pluralist democracies have a harder time to move their issues and frames onto the political agenda and that the lack of direct access to the political realm makes them more strongly use outside strategies (Kollman, 1998) and media support. The UK and the US stand for pluralist systems characterized by a multitude of NGOs with no or only little tripartite consultation and agreement. Thus, we expect a strong coalition with the media in particular which should show up stronger in the US and the UK than in Germany and Switzerland. The food issue networks in the US and the UK are supposed to be larger and denser, and challenger actors should be more frequently interlinked than in Germany and Switzerland. We take Germany and Switzerland as examples of corporatist systems in which peak challengers have at least some access to the political process. Consequently, in such systems, they use lobbying strategies in the form of interpersonal contacts and even legally accepted direct consultation to advocate their interests. For countries like Germany and Switzerland we expect a broader spectrum of actor types in the networks and stronger ties to other NGOs and also to political actors. Furthermore, we expect the networks in the rather corporatist countries like Germany and Switzerland to be more closely connected with the political and industrial food complex consisting of food regulation government offices, strong interest groups and the food industry.

Methods

Our empirical study uses data from an ongoing project “The impact of online communication on the political public sphere - Comparing agenda-building processes across countries and issue fields.” The research design allows us to reconstruct online issue networks in the food safety sector and to observe their development. In order to identify the communication structures and coalitions we developed a multistep data collection strategy. For depicting the hyperlink networks we used the web crawling tool Issue Crawler (www.issuecrawler.net) which enables us to capture and record all hyperlinks within (internal links) and more important between websites (external links) up to a certain degree starting from predefined source seeds. In each country, we identified central challenger organizations using google searches, checking websites of organizations and eventually consulting with experts for the issue in each country. This procedure led to a final list of 52 possible actors including their web sites. We checked these websites (i) for availability, (ii) whether food safety was a central topic and if so (iii) whether the food

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2 This study takes place at the Freie Universität Berlin, Germany and the University of Bern, Switzerland and is jointly funded by the German Research Foundation (DFG) and the Swiss National Science Foundation (SNF).
safety section was up-to-date. In the end we selected eight websites of NGOs or civil society actors per country (six for Switzerland) as starting points of the “snowball” crawling procedure (see Appendix I). The snowball technique can be regarded as the least restrictive mode of hyperlink analysis. Starting from the “seed URLs” the tool literally crawls from one web page to another using every hyperlink on these pages as a pathway. This iterative process leads the Issue Crawler away from the webpage of the “seed URL” to pages on the same as well as to pages of different web sites that are hosted by different organizations. Two rules were defined regarding (i) crawl depth and (ii) degree of separation (see Figure 1).

(i) The crawl depth denotes the number of steps the Issue Crawler follows hyperlinks within a website – the vertical dimension of crawling. For our analysis we chose a crawl depth of two\(^3\), i.e. the crawler locates and follows all (internal) hyperlinks on a starting page that direct to other pages on the same website. This process is repeated once again so that all pages hyperlinked by the starting page (level one) as well as all pages hyperlinked by level one pages (level two) are included in the network.

(ii) The Degree of separation determines the number of steps the Issue Crawler follows external hyperlinks or outlinks. We chose a degree of separation of one, i.e. the crawler locates and follows all (external) hyperlinks on the starting page\(^4\) that direct to pages of other websites and includes them into the network. Eventually, these websites hyperlinked by the starting pages are also vertically crawled like described in the passage above. The crawler once more locates and follows external hyperlinks on these pages if they link back to the already existing body of websites in the network.

Figure 1: Logic of the network identification process.

The output of a crawling procedure with the Issue Crawler is a large list of interlinked URLs. URLs from the same website are automatically bundled and renamed after their domains name.

Although the name of the Issue Crawler suggests that it captures webpages that contain text referring to a specific issue, the tool actually adds pages and sites to the network regardless of their content. In order to make sure that we capture the thematic network without the noise of non relevant content we applied a web scraping tool to check the pages identified by the Issue Crawler.

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3 We decided on a degree of separation of one, since a higher level would also include the outlinks from the websites included in the first step, thereby growing the network exponentially; this would have made data handling (and coding) much more complex.

4 In regard to the degree of separation of one the starting page is synonymous with the “seed URL” as this procedure is uniquely performed for all seed URLs.
The *Visual Web Spider* allows us to search for issue related keywords in the web pages and therefore narrow down the network to the relevant content. The search terms and definitions are included in Appendix I.

The empirical basis for the analyses of this paper are four crawls in June 2012 each for every country under study. These crawls include in sum 6396 sites and consist of 61056 pages, of which we identified about 22728 pages in the scraping procedure as relevant (see table 1).

**Table 1: Empirical basis of the analysis**

<table>
<thead>
<tr>
<th></th>
<th>Germany</th>
<th>Switzerland</th>
<th>UK</th>
<th>USA</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td># of sites before scraping</td>
<td>1003</td>
<td>853</td>
<td>1241</td>
<td>3299</td>
<td>6396</td>
</tr>
<tr>
<td># of pages before scraping</td>
<td>14390</td>
<td>9906</td>
<td>14904</td>
<td>21856</td>
<td>61056</td>
</tr>
<tr>
<td># of scraped pages</td>
<td>2807</td>
<td>1897</td>
<td>5469</td>
<td>12555</td>
<td>22728</td>
</tr>
<tr>
<td># of sites in the final network</td>
<td>258</td>
<td>171</td>
<td>375</td>
<td>1853</td>
<td>2657</td>
</tr>
<tr>
<td># of organizations in the network</td>
<td>231</td>
<td>157</td>
<td>337</td>
<td>1650</td>
<td>2375</td>
</tr>
</tbody>
</table>

The networks are analysed on the level of organizations. All of the pages in the network were first attributed to the different domains. In a second step, these domains were checked for the actor or organization publishing them.\(^6\) If an actor or an organization published different domains, all of these were attributed to the organization, thereby resulting in a total of 2375 organizations or individual actors (such as bloggers) in all four countries.

We classified all organizations and actors in the network into five broad categories, which we built following Habermas (2006), who subdivides the public sphere regarding its power structure into four subcategories (political, social, economic and media power) and Rucht et al. (2008), who make a similar subdivision into four categories. We added a fifth category (single citizens/bloggers), for those actors who could not be attributed to one of the other categories, taking into account the possibilities of articulation the Internet offers to individuals. Accordingly, we distinguish between (1) political and state actors, (2) socio economic interest groups, (3) non-profit actors of civil society, (4) traditional media available on the Internet as well as (5) single citizens and private persons.\(^7\) By doing so, we can identify the interlinking patterns of different societal groups and the coalitions they may form online (see for the definition Appendix II).

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\(^5\) After the scraping procedure we performed a further reduction process: in order to make sure that the hyperlink networks still remain networks consisting of nodes (websites) connected by hyperlinks, we removed every website that was isolated after the scraping process, i.e. websites that do not anymore send or receive a hyperlink from or to another website that meets the scraping criteria.

\(^6\) The coding of domains was done by two trained coders; 259 domains were coded within a larger project context (see footnote 1). The variable “type of actor” reached an inter-coder reliability of .78 (Krippendorff’s α).

\(^7\) These categories do not exactly accord with the concept of challengers. The category challengers was constructed by merging “civil society actors” and “group of citizens / private persons”.

In order to more precisely disclose patterns of connection among actors within the issue networks, we conducted an analysis of cohesive subgroups. “Cohesive subgroups are subsets of actors among whom there are relatively strong, direct, intense, or frequent positive ties” (Wasserman & Faust, 2009, p. 249). There are several concepts of cohesive subgroups that vary in terms of restriction (Hanneman, 2001; Wasserman & Faust, 2009, p. 249ff). In our analysis we applied the concept of 2-cliques. A 2-clique consists of a subset of at least three actors in which every member of the subgroup is reachable by any other member through at most one intermediary or a path length of 2.  

III Findings

Our empirical findings relate to the composition of the food safety hyperlink networks induced by challengers. Since hyperlink networks are an approximation of closeness regarding the issues and perspectives these actors work on (Pilny & Shumate, 2012), we can see where the challengers seek their allies. We describe the networks focusing on (i) the dominant actors in terms of their indegree-centrality as well as on (ii) cohesive subgroups within the networks, i.e. “subsets of actors among whom there are relatively strong, direct, intense […] ties” (Wasserman & Faust, 2009, p. 249). Special attention is given to the importance of (iii) the traditional media’s online outlets as allies of challengers in raising attention fostering the career of the food safety issue in public debate.

The base of our data interpretation are network graphs (see Figures below) as well as the according actor type adjacency matrices. Nodes in the network graphs represent organizations while arrows represent hyperlinks among them. The colour of the arrow indicates the actor type of its source node, e.g. green arrows are hyperlinks that were designed by an NGO while the arrowhead points to the target organization. The size of a node is proportional to its indegree, i.e. the bigger a node is the more inlinks it has. Accordingly the size of an arrow indicates the frequency of a hyperlink connection. The more frequently an organization links to another, the bigger the arrow between the respective organizations becomes.

The adjacency matrix shows who connects to whom. Thereby the senders of a hyperlink are located in the row cells while the receivers are located in the column cells. The values in the matrix indicate the frequency of interlinking between the respective actor type groups. We dichotomized the adjacency matrices on the organizational level, i.e. we standardized the frequency of a hyperlink connection between every pair of actors to one. That is, we distinguish only between present and absent hyperlinks between pairs of organizations disregarding if organization A links 99 times or only once to organization B.

Table 2 shows the distribution of actors in the challenger induced food safety networks across countries. We see that in the three European countries, the challengers first and foremost seek to build coalitions within the NGO and civil society sector, since around 40 percent of all actors in the network belong to this group. The media are the second most important actor group with whom challengers connect themselves, except for the UK. Another feature that applies to three out of four countries is that political actors rather seem to play a marginal role in the mobilization of food safety,

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8 We comprise only mutual interlinks (or reciprocal dyads) between pairs of actors into the analysis of cohesive subgroups as we consider them as an indicator of a strong and intense connection.
except for Switzerland. The overview indicates that there are different actor constellations in each country which we discuss in more detail in the next section.

Table 2: Distribution of actors within the food safety issue networks across countries (percent)

<table>
<thead>
<tr>
<th>Country Actor group</th>
<th>Germany</th>
<th>Switzerland</th>
<th>United Kingdom</th>
<th>United States</th>
<th>Average all countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political actors</td>
<td>11,7</td>
<td>17,8</td>
<td>14,0</td>
<td>6,9</td>
<td>12,6</td>
</tr>
<tr>
<td>Socio-econ. groups</td>
<td>7,8</td>
<td>10,2</td>
<td>25,8</td>
<td>9,0</td>
<td>13,2</td>
</tr>
<tr>
<td>NGO’s and civil society</td>
<td>41,1</td>
<td>39,5</td>
<td>40,1</td>
<td>19,7</td>
<td>35,1</td>
</tr>
<tr>
<td>Media</td>
<td>33,8</td>
<td>23,8</td>
<td>11,3</td>
<td>54,1</td>
<td>30,8</td>
</tr>
<tr>
<td>Citizens</td>
<td>2,6</td>
<td>7,0</td>
<td>2,7</td>
<td>5,3</td>
<td>4,4</td>
</tr>
<tr>
<td>other</td>
<td>3,0</td>
<td>1,9</td>
<td>6,2</td>
<td>5,0</td>
<td>4,4</td>
</tr>
<tr>
<td>N (organizations)</td>
<td>231</td>
<td>157</td>
<td>337</td>
<td>1650</td>
<td>594</td>
</tr>
</tbody>
</table>

Switzerland

The food safety network in Switzerland contains 157 actors and 235 ties (average degree = 1,50). It is characterized by a handful of strong NGOs (like Zukunftsstiftung Landwirtschaft, Stiftung für Konsumentenschutz, Foodwatch, Informationsdienst Gentechnik, agrar-info.ch) (39,5 percent) that relate to each other (21,9 percent) on the one hand and a relatively large presence of political administrative agencies (17,8 percent) on the other hand. Switzerland is the only country where political actors (like Bundesamt für Gesundheit) hold a significant position in the network and seem to be well integrated with challengers and citizens, even though the direct linking between the actor groups is not very strong. The center of the Swiss food safety network is built by a national coalition of agricultural organizations, environmental and food watch organizations as well as food safety and public health agencies run by the state.

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As we investigate comparatively large networks the average degree of a node, i.e. the overall number of ties divided by the overall amount of nodes in the respective network might be a better indicator for the interconnectedness of the network than the density itself. The density value of a network is “the ratio of the number of lines [ties]... to the maximum possible” (Wasserman & Faust, 2009, p. 101). The larger the network in terms of nodes becomes the smaller the density gets.
Switzerland also stands out from other countries by its presence of individual citizens who run individual food safety information blogs (e.g. agrar-info.ch or FarmWars). Bloggers are quite active in linking themselves with NGOs (14,5 percent), media (12,7 percent) and political actors (9,2 percent). At the same time, the direction of linking is unilateral, since other actors are less eager to send out links to the citizens’ blogs (total 8,5 percent).

A closer inspection of the linkages between bloggers and other actors reveals that the food safety network in Switzerland next to the national coalition between Swiss political actors and challengers feature a second center which opens up the Swiss debate for international dimensions and other thematic aspects. The cluster of organizations emerges through a link of the ETH, the most renowned Swiss national university that holds a strong research focus in natural sciences. Obviously the ETH set out a link to two international key players, the health section of the New York Times and the Real Climate.org blog. These actors do not only internationalise the debate on food safety but the NYT itself features a platform for several food safety and green blogs. These blogs (*green.blogs.nytimes.com* and *dotearth.nytimes.com*) are responsible for the strong connection between citizens’ blogs and traditional media. This connection internationalises the Swiss food safety
network and links it to a broader coalition of environmental activists who in their blogs draw a connection between the problems of climate change and the problems of food safety.

Media actors do not seem to play a significant role in the food safety network established by the Swiss challengers. Only 10.4 percent of all linkages refer to the media and this number already includes the disproportionately prominent N.Y. Times. Thus, the Swiss media seem to be rather passive as they send only few links to other actors (9.3 percent).

The analysis of cohesive subgroups corroborated this interpretation of the coalitions. Only two 2-cliques were identified. The first one consists of three NGOs for consumer protection (Die Konsumentencharta, Fédération romande des Consommateurs & Stiftung für Konsumentenschutz), while the second depicts the international orientated part of the network described above (Mongabay.com (media), RealClimate (blog), The New York Times (media)).

**Germany**

In the German case the hyperlink network contains 231 organizations and 435 ties between them (average degree = 1.88). 41 percent of these organizations are NGOs and civil society actors that we regard as challengers. Another 3 percent were coded as single private citizens that run blogs or highly frequented information websites. These bloggers most frequently link with NGOs (e.g. produktrückrufe.de) (17 percent). Another blog like “Verbraucher-Papst.de frequently links to media actors. One could interpret these connections of citizens as “aspirational links” (Rogers, 2010, p. 6) meaning that small organizations distribute information by referring to established or larger organizations thereby striving for funding or organizational support. Another interpretation could be that citizens use their blogs to gather and distribute consumer related information.

In the overall network, the second largest group of actors are media actors (34 percent). Political and administrative entities make up for 12 percent and socioeconomic pressure group organizations for 8 percent of all actors. The distribution indicates that challenger actors connect with actors from different societal subsystems. However the largest share of 38 percent of all hyperlinks remain in the NGOs and civil society sector.

The German food safety network has three branches each of which are focusing on one of three thematically distinct challenger organizations. The core of the network is build around organizations that work on food safety in the framework of safe agriculture of healthy food production by farmers (Meine Landwirtschaft.de, Zukunftsstiftung Landwirtschaft). The second center of challengers emerges as cluster of food watch organizations that monitor the food production. In this cluster two actors from the political sector, namely the federal agency for consumer protection and the federal agency for risk evaluation are tied in. The third center of the German food safety network concentrates on organizations connected with Slow Food that discusses questions of food production, food preparation and food consumption. Interestingly enough the three centres of the food safety network are not very integrated but seem to build up separate coalitions.
The media play a crucial role as they are the most significant sources for information published on challenger websites. The online editions of traditional media receive 23 percent of the hyperlinks from NGOs and civil society actors within the network. However, instead of acting as significant players, they stand out as source of information mentioned primarily by challengers of the agricultural cluster. Considering the fact that media themselves sparsely link to other actors (5.7 percent) their role can be described as rather passive. The same holds up as regards the interlinking pattern of political and administrative entities: Political actors are targets of hyperlinks to a remarkable extent (13 percent). They are linked to especially by challenger actors (NGOs, civil society actors and single citizens) while they themselves almost exclusively link to other political or administrative entities.
The cohesive subgroup analysis details the interpretation of the visual network graph.

### Table 3: Clique in the German food safety network

<table>
<thead>
<tr>
<th>Description</th>
<th>Agriculture and GMO-NGOs</th>
<th>Political and administrative Entities</th>
<th>Media-NGO-Group (Media-activism)</th>
<th>Ethics-Group</th>
<th>Consumer Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GMO-Free Europe</td>
<td>Bundesinstitut für Risikobewertung</td>
<td></td>
<td></td>
<td>Verbraucherzentrale Hamburg e.V.</td>
</tr>
<tr>
<td></td>
<td>Kampagne Mein landwirtschaft</td>
<td>Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz</td>
<td></td>
<td></td>
<td>Verbraucherzentrale Bundesverband e.V.</td>
</tr>
<tr>
<td></td>
<td>Zukunftsförderung Landwirtschaft</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forum für Internationale Landwirtschaft</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The groups depicted in the Table 3 map the dimensions of the German debate on food safety nicely. The first group consists of NGOs with agricultural focus, while the second one consists of political and administrative entities only. The third group can be regarded as a classical group of an NGO-organization (Foodwatch) that use their mutual relations with the media and a frequently used blog (Produktrückrufe.de) to put forward their issues. The mutual interlinking of Foodwatch (NGO) and “Die Zeit” which is one of Germany’s’ important opinion leading media actors can be regarded as very influential. The ethics-group consists of three NGOs that mainly dispute for the non-usage of genetically modifying technologies. These connections show that the discourse on food safety is somehow linked to an ethical discourse as well. The consumer protectionist point of view is represented by NGOs that have a long history in the German consumer protection policy field and can be considered as well organized and influential.

### United States

The US network is different: not only does it contain far more organizations (1650 nodes) and ties (3336) than the networks of the European countries, it also features a slightly denser interconnectedness with an average degree of 2.02. In the United States, media represent the dominant group of actors (54 percent) whereas only 19.7 percent of the overall amount of nodes belong to challenger actors, NGOs and civil society actors respectively.
The structure of the network is extremely detailed but features basically three poles. The core of the network belongs to a coalition of challengers in the food safety sector and a diverse array of media whereas more media than challengers appear in the network. A second focus builds up around one blog, the barfblog which is a platform on food production and consumption sponsored by the University of Kansas. This single blog very strongly links to a large number of media. Accordingly, the interlinking matrix reveals that the media are to a much lesser degree the source of hyperlinks (4 percent) than they are the targets (14.7 percent). This means that the blogs and websites of challengers use the media as witness for their issue or argument. In the US we see most clearly that even though the media represent the absolute majority of actors in the network, they remain rather passive. Only 12.7 percent of all links run out of them. We interpret this finding as an indication that they serve challengers and citizen bloggers as reference and source of information rather than a motor of issue mobilization.

The third group in the network consists of political and administrative actors. They make up for 6.9 percent of all actors in the network which is the lowest share in all countries. Even though these actors draw considerable 11.9 percent of all links upon them, originating mostly in NGOs and citizen
information blogs, their role is a passive and isolated one. The political actors are the targets but not the source of the links, and the few connections they make remain within the political administrative realm.

The interpretation of the visual graph nicely matches the results of the analysis of 2-cliques. 20 2-cliques were found, while most of them overlap to a large extent and show very similar patterns. These overlapping 2-cliques make up the center cloud of the networks graph. NGOs like Food & Water Watch, the Organic Consumers Association, the Center for Food Safety or the Consumers Union maintain many mutual links with a diverse range of other actor groups. In the 2-clique the NGOs and civil society actors relate first and foremost to the established media (like The Huffington Post, The New York Times, Los Angeles Times) and issue-specific media (like MotherJones, TreeHugger, Civil Eats, or Grist Magazine) as well as to blogs (like La Vida Locavore, The US Food Policy Blog, Appetite for Profit or the before mentioned barfblog). This indicates that the great plurality of single-issue groups dealing with food safety is well interconnected and uses their ties to the media to enhance their issue. It is an interesting finding that none of these subgroups shares mutual links with governmental institutions or any other political or administrative entities. Instead two of the identified 2-cliques consist of these political actors only containing actors like the Centers for Disease Control and Prevention, the Food Safety Inspection Service (which is part of the US Department of Agriculture) as well as the US Food and Drug Administration and the White House.

**United Kingdom**

The hyperlink network of the United Kingdom must be interpreted with caution, since it contains much noise. A check of the online material shows that only about five percent of the overall output contains meaningful sites and pages for analysis. It is therefore pressing to include more crawls and a longer time span into the further analysis. In the current first take of the data for this paper, the network contains 337 actors and 662 ties.

The British food safety network stands out from all other cases by its distinct structure and by the position of socio economic pressure groups which are far more present than in the other countries’ networks. Thus, socio economic interest groups make up one fourth of all actors in the network (25.8 percent) while they are less than 10 percent elsewhere. The UK network does expose two big clusters of actors. On the one hand we see a dense communication structure between challengers and traditional lobby groups such as “Organic Trade Board” and “Natural & Organic Products Europe”. The network is filled with quite many diverse pressure groups from the agricultural sector that seem to be well integrated with the challengers. The cluster gathers around the NGO Sustain which entertains a tie with Greenpeace that links up with other challengers. Like in other countries the challengers in the UK seek their allies among other challengers, so there are strong affiliations to start with.
The second cluster in the British network consists of links to political and administrative actors. 25 percent of all links relate to political actors which include the Department of Environment, Food and Rural Affairs, Health Safety Executive Environmental Agency as big players. Interestingly enough, challengers and traditional interest groups seek affiliations with political and administrative actors. At the same time, the governmental and public agencies are reluctant to link up to challengers and pressure groups, so this connection seems to be a one way street.

Compared to the other countries, the media in the UK play a marginal role in the food safety issue network. With only 11 percent of all links, the media are remote players and the challengers do not seem to seek an alliance with them. In the links that are visible after all, the media are the targets instead of the origin of links which confirms their overall passive role in agenda building of food safety that has been visible throughout our study.

The analysis of cohesive subgroups shows that there are hardly groups consisting of three or more actors that maintain a mutual interlinking pattern. Only two 2-cliques were identified. The first one is equal to the Swiss international 2-clique, that consists of the New York Times, respectively the blogs hosted by them, the RealClimate-blog and Mongabay.com which provides environmental news. The
second 2-clique consists of three regional subdivisions of the same company the “Chartered Institute for Environmental Health.

IV Discussion and Conclusion

The findings of our study on challenger induced food safety networks point to specific national constellations of issue mobilization on the internet, since the comparison of hyperlink networks reveals quite significant differences across the four countries. We started out with the hypothesis that pluralist countries like the US and the UK display a coalition structure on the Internet in which challengers use the traditional media to push their issue into public debate while in consensual democracies like Germany and Switzerland we would find a broader spectrum of actors involved with challenger communication. Our findings confirm this hypothesis in the cases of (corporatist) Switzerland and (pluralist) United States. In the US, media, bloggers and NGOs build a firm coalition to mobilize the issue of food safety. In Switzerland, we find that NGOs rather link up with political actors in order to move their cause while the national media are holding back in the advocacy coalition.

The UK and Germany deviate from the expected pattern. Interestingly enough, the UK features a hyperlink issue network in the food safety sector that unites challengers and socio economic interest groups. The NGOs in their communication about food safety connect to the websites of agricultural interest groups in order to mobilize the issue while outside strategies to seek the support of the media are not relevant in their action repertoire. With this pattern of communication, the UK features a network structure that we had rather expected in a corporatist country.

In Germany, we find a strong coalition of challengers and media like in the US. This network pattern in food safety politics indicates that food protest uses outside mobilization strategies to draw public attention to the issue, instead of inside negotiations. This finding may be interpreted in the light of changes in German policy making and governance at large. For instance, Steiner and Jarren (2009) argue that the media’s influence in policy making in Germany has grown and simultaneously provoked a gradual decline of corporatist arrangements in favor of more competitive interest group politics. The role of media in agenda building and mobilization of food safety of both Germany and the US has been quite significant and confirms this reading. However, we also see in the issue networks of the US and particularly in Germany that the media are not active communicators but rather passive object actors. They are used by the challengers as sources for information or opportune witnesses of arguments and therefore legitimization agencies for their cause. By contrast, in countries where the food safety challengers seek coalitions with political and administrative actors and socio economic groups the media do not play a significant role.

Interestingly enough, we find that national agenda building and mobilization in an otherwise consensual policy field can be “interrupted” by online communication activities, for instance by the inclusion of international media. The Swiss case is instructive in this respect. We see that in Switzerland challenger organizations are connected to the New York Times which brings a broad and diverse spectrum of citizen bloggers into the debate. This coalition opens up the otherwise nationally confined debate for new actors and arguments. Moreover, we see that the connection to bloggers in other fields such as climate change adds to the broader mobilization of food issues.
All in all, our study is instructive for the role of the Internet in agenda building of food safety: In countries where the issue is confined into national political interest groups arrangements the mobilization can be triggered only by transnational communication from outside. In countries where challengers do not find support within national policy arrangements their communication strategies uses the internet to connect to traditional media in order to bring food safety questions into the public debate.
### Appendix I: Source seeds and search terms

| Food safety | Lebensmittelsicherheit OR ((Lebensmittel* OR Nahrung* OR Futter*) SAME (Erreger* OR Keim* OR Epidemi* OR Seuche* OR Krankheit* OR Gesundheits* OR Infiziert* OR Verunreinig* OR Kontamin* OR Belast* OR Gentechni* OR gefähr* OR Gefahr* OR Skandal* OR Hygien* OR Risiko* OR EFSA OR BVL OR BAG))
| | http://www.vzbv.de/Ern%C3%A4hrung.htm
| | http://www.foodwatch.de
| | http://www.verbraucher.org/verbraucher.php/cat/3/title/Ern%E4hrung
| | http://www.greenpeace.de/themen/landwirtschaft/
| | http://www.verbraucher-papst.de/category/essen-und-trinken/
| | http://www.meine-landwirtschaft.de/
| | http://www.slowfood.de/
| Source seeds Switzerland | http://konsumentenschutz.ch/kernthemen/lebensmittel/
| | http://www.greenpeace.org/switzerland/de/Kampagnen/Landwirtschaft/ (seit Juni 2013 geändert in: http://www.greenpeace.org/switzerland/de/Themen/Landwirtschaft/)
| | http://www.agrar-info.ch/essen-ist-leben/
| | http://www.agrarallianz.ch/ (Dez. 2012 Änderung in: http://agrarinfo.ch/category/ernaehrung/)
| | http://www.slowfood.ch/
| Source seeds UK | http://www.which.co.uk/about-which/what-we-do/which-policy/food/food-safety/
| | http://www.consumerfocus.org.uk/wales/policy-research/food
| | http://www.sustainweb.org/
| | http://blog.acornsafety.co.uk/category/safety-topics/food-safety-news-and-advice/
| | http://www.greenpeace.org/international/en/campaigns/agriculture/
| | http://www.cieh.org/policy/food_safety_nutrition.html
| | http://www.foe.co.uk/get_involved/natural_resources.html
| | http://www.soilassociation.org/
| Source seeds US | http://www.centerforfoodsafty.org/
| | http://www.cspinet.org/foodsafety/
| | http://www.foodandwaterwatch.org/food
| | http://www.organicconsumers.org/foodsafety.cfm
| | http://notinmyfood.org/newsroom
| | http://barfblog.foodsafety.ksu.edu/barfblog
| | http://www.greenpeace.org/international/en/campaigns/agriculture/
| | http://www.pewhealth.org/topics/food-safety-327507

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10 Die search terms für das food issue variieren geringfügig nach Konvention der jeweiligen Textquelle. Die angegebenen search terms beziehen sich auf die Datenbank Faktiva.
### Appendix II: Type of actor - Coding categories for the actors associated to the domains.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political and state actors</td>
<td>All actors from politics and state, such as government, parliament, political parties, state executive agencies, judiciary, police, international organizations, etc.</td>
</tr>
<tr>
<td>Socioeconomic pressure groups</td>
<td>All actors from the business sector, such as firms and companies, employer’s organizations. Also trade and professional associations, employee’s associations and trade unions belong here.</td>
</tr>
<tr>
<td>Non-profit actors of civil society</td>
<td>All non-governmental actors, civil society groups and groups from the movement sector such as environmental or food movements and groups, welfare organizations or foundations, consumer organizations and groups, scientific and research professionals or institutes, churches &amp; religious organizations belong here.</td>
</tr>
<tr>
<td>Media and journalists</td>
<td>All actors from the media sector, such as online news platforms, online outlets of traditional media and sites from publishing and film companies belong here.</td>
</tr>
<tr>
<td>Citizens and private persons</td>
<td>All single actors with an online presence who do not belong to categories 1-4, such as single or groups of bloggers belong here.</td>
</tr>
<tr>
<td>Other actors</td>
<td>Forums, content sharing platforms, campaigning platforms, etc.; also sites which cannot exactly be identified belong into this category.</td>
</tr>
</tbody>
</table>

### References


