

**Challenger Networks of Food Policy on the Internet: A Comparative Study of Structures and Coalitions in Germany, the UK, the US, and Switzerland.**

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# Challenger Networks of Food Policy on the Internet: A Comparative Study of Structures and Coalitions in Germany, the UK, the US, and Switzerland

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## ABSTRACT

In times of genetically modified food, globalized production and distribution chains, food safety is a major issue in public policy. Although industrial actors have traditionally had remarkable influence on political decision-making in this area, challenger organizations from civil society have gained influence by mobilizing support and shaping public discourse on the Internet. The authors' study analyzes online issue networks concerning food safety in order to assess the actor constellations and coalitions that may serve as an opportunity structure for the mobilization of the issue. By comparing the US, the UK, Germany, and Switzerland, the authors investigate the differences in policy settings between pluralist and corporatist democracies. They find that the mobilization structures related to food safety issues are actively promoted by the challengers themselves. In countries where challengers do not find support within national politics, the challengers' online communication refers to mass media as witnesses to legitimize their concern in public debates.

## KEYWORDS

Agenda Building, Civil Society, Food Safety, Hyperlink Networks, International Comparison, Issue Networks, Network Analysis, NGOs, Online Communication

## INTRODUCTION

On January 25, 2013, the New York Times reported about Sarah Kavanagh, a 15-year-old high school student from Mississippi, whose favorite drink was Gatorade (Strom, 2013). She had learned that it contains an ingredient 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.

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After the issue had been picked up by the mass media, the producer of Gatorade, PepsiCo, changed the recipe. The Center for Science in the Public Interest, a public advocacy group in the food and public health sector, said they had been fighting for the change of the recipe for “the last several decades” (Strom, 2013) and nothing had changed. This case relates to our study, since it shows in a nutshell the process through which issues of food safety may be mobilized on the Internet: Agenda building was driven by citizens who took action online and their campaign spilled over into the mass media and built up public and political pressure. In the political sphere, such a case may eventually result in changes in the regulation of food production. The Gatorade case raises the question of whether this observation is typical for the conditions under which food safety becomes an issue of wider public debate and potentially of political action.

While there is no doubt about the significance of food safety issues for consumers (Lien, 2004), apart from scandals and symbolic politics, the policies of food regulation have been less present in the public debate (De Jonge, Van Trijp, Renes, & Frewer, 2010; Feindt & Kleinschmit, 2011). Food policies seem to remain in the arena of negotiations between the food industry and the health and agricultural regulation bureaucracy. However, there has been growing activism among social movement actors regarding the food issue. Our study refers to challengers—that can be regarded as a subset of social movement actors “who do not have routine access to the decision-making arena or to the established media” (Kriesi, 2004, p. 196). Civil activists concerned about the issue have increasingly observed health risks connected to food and production modes (Blue, 2010; Lang, Barling, & Caraher, 2009) and are thus demanding radical, costly shifts in food production, distribution, and sale.

In the politicization of food, the constellations of actors and the conditions of communication are significant. Social movement studies suggest that challengers become active in public communication and use mass media to elevate their issues to the level of political decision-making (Chadwick, 2006, pp. 134ff.). For them, online communication offers an alternative route to the media agenda and eventually to public and political attention (Chadwick, 2006, pp. 116ff.; see also Pfetsch, Adam, & Bennett, 2013). In agenda building, challengers establish empirically observable patterns of communication on the Internet in order to build coalitions to mobilize behind issues. Therefore, the current research in contentious politics focuses on the analysis of linking patterns and online issue networks of social movement organizations (Ackland & O’Neil, 2011; Bennett & Segerberg, 2012). Since online issue networks include many actors from different societal subsystems, their composition and structure allow for the assessment of their strength of connectivity, which can be taken as an indicator of their mobilization potential. For instance, a dense network can be interpreted as a driver for mobilizing behind issues and setting them on the media’s agenda and the political agenda.

However, political agenda building studies stress that the dynamics of communication in the course of mobilizing behind political issues is highly context-dependent (Van Aelst, 2014). Communication and coalitions must also be considered in the light of political opportunity structures such as national patterns of interest mediation. The type of democracy that organizes the power distribution of political actors and interest groups in the structure of decision-making is crucial here because it directs information flows and media attention. Most useful in this respect is the differentiation between pluralist and corporatist democracies (Lijphart, 1999). We hypothesize on one hand that under the conditions of pluralist democracies, the mobilization behind issues largely depends on whether challengers succeed in building strong coalitions with other challengers, thus drawing media attention. On the other hand, in corporatist democracies, online issue networks are expected to be more inclusive as regards political elites and conventional interest groups.

Against this background, our study analyzes the actor constellations and structures of online issue networks concerning food safety comparing four Western democracies (Germany, the UK, the US, and Switzerland). With respect to their potential for mobilization, we ask:

1. Who are the dominant actors, and what kind of constellations and coalitions are present in the online issue networks regarding food safety?
2. What is the role of the news media in the issue networks, and what can we conclude from the linkage between mass media and challengers regarding their potential for mobilization?
3. How do these structures of issue networks concerned with food safety differ between pluralist and corporatist democracies?

The study proceeds in three steps: In the next section, we present the theoretical framework, which is rooted in agenda building research. In the subsequent empirical investigation, we comparatively analyze the structures of food safety online issue networks. In the concluding discussion, we interpret the resulting issue networks as opportunity structures for the mobilization behind food protests.

## THEORETICAL FRAMEWORK

We assume that the mobilization behind food safety depends on the processes of communication and coalition building. The theoretical framework draws on the literature of agenda building research (Cobb, Ross, & Ross, 1976; Denham, 2010; Wolfe, Jones, & Baumgartner, 2013). In particular, the concept of *political* agenda building allows investigation into the “processes by which groups attempt to move issues from their own agendas to those of policymakers” (Denham, 2010, p. 308). Political agenda building by challenger organizations can best be described with the outside initiative model (OIM) by Cobb et al. (1976, pp. 127ff.). It suggests that actors from outside the realm of institutionalized policy-making initiate the career of issues, which relate to a grievance or conflict on societal values. Grievances are then translated into specific political demands. In a phase of expansion, these actors need to create sufficient salience and support 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” (Cobb et al., p. 128). The transfer of an issue depends crucially on whether new supporting actors join an issue coalition. When the issue arrives on the media agenda, it draws the attention of the general public, and spill-over from the media agenda to the political agenda is thus possible. The OIM, of course, represents an idealized political agenda building process initiated by challenger organizations. In reality, the sequences of the process are less structured. Instead, one would expect a more continuous process with partly simultaneous and overlapping progression. For our study, the model is instructive since we focus in particular on the expansion phase of the food safety issue in which coalition building and networking are crucial.<sup>1</sup>

### Online Issue Networks as Starting Points for Mobilization

In social movement studies, there has been widespread agreement that the Internet offers alternative avenues for civil society actors to draw attention to their claims on their websites and in their blogs (Chadwick, 2006, pp. 116ff.). Current research therefore focuses on 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). It has been observed that online communication has become a viable means of communication on food risk questions, since challengers depend to a large degree on the possibilities of the Internet (Rutsaert et al., 2013).

Advocacy in challenger communication and coalition building plays out in online issue networks, which 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 (Park, 2003). They are set intentionally (Shumate, 2012) to direct users from one website to another and consequently guide users’ information-seeking behavior. From the perspective of the communicator, hyperlinks are instances of the communicative integration of actors relevant within the thematic context of that specific issue (Zimmermann, 2006). Hyperlinks can be interpreted as a proxy for

real world social movement activism (Carpenter & Jose, 2012) and “for partnerships and alliances between organizations” (Weber, Chung, & Park, 2012, p. 117).

Online issue networks are established by a diverse range of actors (Shumate, 2012). Rogers (2010) maintains that small organizations use hyperlinks to indicate that they wish to associate with larger organizations for funding or support of their claims. Shumate (2012) found that non-governmental organizations (NGOs) have a clear preference for the popular websites of other NGOs in the same issue network; however, online challenger networks are also penetrated by other organizational actors who seek to link with them in order to shape public discourse, including governmental, economic, or media actors. Accordingly, if challengers kick off an online issue network, it is likely that established actors such as corporations, political parties, or the mass media will become part of the network.<sup>2</sup> In the political agenda building literature, it is still taken for granted that the established media form the main “battleground” (Castells, 2008, p. 85) of NGO campaigns. Their role is twofold. On one hand, they can be “key player[s] 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). In this respect, they can be coalition partners in issue networks. On the other hand, the traditional mass media may still act as gatekeepers of the spill-over into the political system. Thus, they may be the targets of the communication in online issue networks but by their selectivity also avoid the further transfer of an issue. In fact, the role and the placement of traditional mass media in issue networks can be seen as a significant factor of mobilization.

### **National Contexts as Opportunity Structures for Mobilization**

Studies on political agenda building emphasize that national political contexts matter (Van Aelst, 2014; Walgrave & Van Aelst, 2006). National differences relate to the opportunity structures of political systems—namely, the type of democracy, the institutionalized governance structure, political configurations, and how a country organizes political responsibility (Walgrave & Van Aelst, 2006). For social movements and political mobilization, the crucial factors are how a country sets up effective opportunities for interest mediation.

We refer to Lijphart’s (1999) distinction of pluralism vs. corporatism, which in his typology are central characteristics of majoritarian vs. consensus democracies. In corporatist systems, the dispersion of political power among a range of political actors inside and outside government is great, and they are included in political negotiations. Thus, corporatist systems depend on consultation, and societal groups have a voice in political decision-making. In pluralist systems political power is highly concentrated in the government, while outside groups are largely excluded from decision-making processes (Lijphart, 1999). Here, we observe high competition among several interest groups and civil society actors. Because they lack direct access to the political system, they have a harder time moving their issues onto the political agenda. This makes them use outside strategies more (Kollman, 1998), such as launching activities which catch public attention and using strategic communication towards the media (Kriesi, 2004).

In our study, the UK and the US have pluralist systems characterized by a multitude of NGOs with little or no consultation and agreement. Germany and Switzerland are considered cases of corporatist systems in which challengers advocate their interests in legally accepted direct consultations. The case selection allows for a study design through which we can investigate our expectations regarding the position of challengers and their coalition building in online issue networks in these four countries. For the pluralist systems of the UK and US, we expect a strong coalition between challengers and the media as well as a strong interlinking with other challenger actors. This should become manifest in food issue networks that are larger and denser than in the other countries—that is, we find more actors in the networks as well as more linkages between them. For the issue networks in the corporatist systems of Germany and Switzerland, we expect instead challengers to link up considerably more frequently with established political actors and traditional interest groups. They are granted access to political negotiations, which indicates a stronger communicative integration of civil society in

political decision-making. Thus, we anticipate a broader spectrum of actor types in the networks as well as ties to political actors in food policy. Furthermore, we expect networks in corporatist countries to include political and industrial actors.

For Germany and the UK it has also been taken into account that both are member states of the European Union (EU). With respect to political agenda building, the EU constitutes a unifying framework which should impact the political opportunity structure for challenger actors. In fact, legislative activity in the policy field of food safety has been extensive over the last decades. However, specific organizational and executive aspects remain within the legislative competences of the EU member states (Janning, 2008), so our empirical analysis has to reflect both the similarity and the differences of the mixture of institutional arrangements. Regarding issue networks that focus on the EU-level, Bennett, Lang, and Segerberg (2015) find that even in highly Europeanized policy fields such as environmental policy, “issue networks (...) are comparatively weak” (p. 134) and that rather nationally bound advocacy groups engage on the European level. Moreover, research on the European public sphere points out that challengers generally play a marginal role in Europeanized public discourse (Koopmans, 2007). We expect to find stronger differences in challenger-induced issue networks between Germany and the UK due to their different national contexts than similarities due to their EU affiliation.

Our claim to find significant issue networks online in all four countries is motivated by the fact that food safety has become an issue of considerable concern to the public<sup>3</sup> as well as to NGOs. The 2010 Eurobarometer (European Commission, 2010) shows that almost 50% of the UK’s population worry about food safety. In Germany, the share is only 21%, but when asked for specific food-related risks such as pesticides or antibiotics, around 75% of Germans express concerns. A 2010 food safety survey shows that also in the US consumers are concerned over risks such as those related to pesticides and antibiotics in food (Lando & Carlton, 2011).

## METHODS

### Data Collection

In this empirical study,<sup>4</sup> we developed a multistep data collection strategy. We used the web crawling tool *Issue Crawler*,<sup>5</sup> which captures and records all hyperlinks within (internal links) and more important between websites (external links), starting from predefined source sites. Thus, the first step was to identify central challenger organizations in food safety for each country as starting points for the crawls. We systematically conducted Google searches, checked websites of organizations,<sup>6</sup> and consulted with experts on the issue in each country. Eventually, we selected eight websites of NGOs or civil society actors per country for the US, the UK and Germany and six organizations for Switzerland as source sites of the “snowball” crawling procedure (for the list of seed websites, see Table 7, in the Appendix). In contrast to other crawling techniques, snowball crawling can be regarded as the least restrictive mode of hyperlink exploration (Miltner, Maier, Pfetsch, & Waldherr, 2013). It is important to note that although the starting websites stem from national organizations, actors from other countries or the EU-level will show up in the issue networks if they are interlinked and are therefore captured by the crawler’s algorithm.

Starting from the source sites, the crawler navigates from one web page to another using every hyperlink on these pages as a pathway, thus leading away from the source sites’ URLs to pages on the same as well as of different websites. Two rules were applied: (1) The *crawl depth* denotes the vertical dimension of crawling, namely the number of steps the *Issue Crawler* follows hyperlinks *within* a website. We chose a crawl depth of two, meaning that the crawler locates and follows all (internal) hyperlinks on a starting page that direct to other pages on the *same* website up to two levels. (2) The *degree of separation* determines the horizontal dimension of the crawls—that is, the number of steps regarding *external* hyperlinks (outlinks). We chose a *degree of separation* of one, meaning that the crawler locates and follows all outlinks on the starting page<sup>7</sup> that direct to pages of *other* websites and

includes them in the network. Eventually, these websites hyperlinked by the starting pages were also vertically crawled as described 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.

The output of the crawling procedure with *Issue Crawler* is a list of interlinked URLs. URLs from the same website are automatically bundled and renamed after their domains' names. Although the name *Issue Crawler* suggests that it captures web pages 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 captured the thematic issue network without irrelevant content, we indexed issue-related keywords from the pages identified by *Issue Crawler*<sup>8</sup> (search terms are included in Table 8 in the Appendix).

### Analysis and Interpretation of Hyperlink Networks

This empirical analysis draws on four network datasets from web crawls performed in June 2014 for each country under study. In none of the countries was there any major food scandal at that time reaching broad public attention. Thus, our data collection took place in a routine month for both the mass media and the political agenda.

In sum, these datasets include 8,030 sites consisting of 58,304 pages, of which we identified 23,740 pages (40.7%) as relevant in the keyword filtering procedure (see Table 1 for numbers of individual crawls).

The networks were analyzed at the level of organizations—that is, all the pages in the network were first attributed to the domains they belong to. Next, these domains were checked for the organization publishing them. The information was usually taken from the “about us” or the “contact” section of websites.<sup>9</sup> If an actor or an organization published different domains, all were attributed to a single organization, thereby resulting in a total of 2,715 organizations or individual actors (such as bloggers) in the networks of all four countries.

For the analysis of the representation and structure of actors, we classified the organizations in the network, building on a categorization similar to that of Rucht, Yang, and Zimmermann (2008), into five categories: (1) political and state actors, (2) economic actors, (3) non-profit actors of civil society, (4) media outlets available on the Internet, and (5) citizen blogs (see Table 9 in the Appendix for detailed definitions).<sup>10</sup>

Since hyperlink networks are an approximation of closeness regarding the issues and perspectives certain actors work on (Pilny & Shumate, 2012), we can see where the challengers seek their allies. In the presentation of findings, we describe the networks focusing on (i) the dominant groups of actor types and their interlinking patterns as well as on (ii) cohesive communities—“subsets of actors among whom there are relatively strong [...] ties” (Wasserman & Faust, 2009, p. 249)—in order to more precisely disclose patterns of connection among actors within the networks. Therefore, we applied the algorithm laid out by Blondel, Guillaume, Lambiotte, and Lefebvre (2008) as implemented

Table 1. Empirical basis of the analysis

	GER	CH	UK	USA
# of sites before filtering	1,010	1,204	2,023	3,793
# of sites in the filtered network	356	317	769	1,998
# of organizations in the network	215	239	558	1,703
# of pages before filtering	13,251	9,463	14,916	20,674
# of pages in the filtered network	2,722	2,353	6,624	12,041

Note: Network data were collected in June 2014. The final level of analysis in the networks is based on organizations. Only those organizations with a degree > 0 are included in the network.



in the software package *Gephi*,<sup>11</sup> The algorithm is based on a modularity optimization procedure,<sup>12</sup> which results in disjunct partitions of the network. Special attention is given to the importance of (iii) media organizations as references for challengers in raising attention and fostering the career of the food safety issue in public debate.

Our data interpretation is based on network graphs (see Figures 1–4) as well as the according actor type adjacency matrices. Nodes in the network graphs represent organizations, while arrows represent hyperlinks among their websites. An arrow's color indicates the actor type of its source node—for example, green arrows are hyperlinks that were sent by an NGO while the arrowhead points to the target organization. The size of a node is proportional to its in-degree: The bigger a node is, the more in-links 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.

The adjacency matrices (Tables 3–6) show who connects to whom. Thus, hyperlink senders are located in the rows while receivers are located in the columns of the matrices. The values in the matrices indicate the frequency of interlinking between the respective actor type groups.<sup>13</sup>

## FINDINGS

The findings of our study reveal that the structure of mobilization behind the food safety issue on the Internet draws on a strong representation of civil society actors (see Table 2). In fact, NGOs and other civil initiatives are the largest group in the challenger networks. In Germany and the UK, these groups make up almost 40% of all actors in the network; in Switzerland and the US, they represent about 30%.

Figure 1. Network: United States

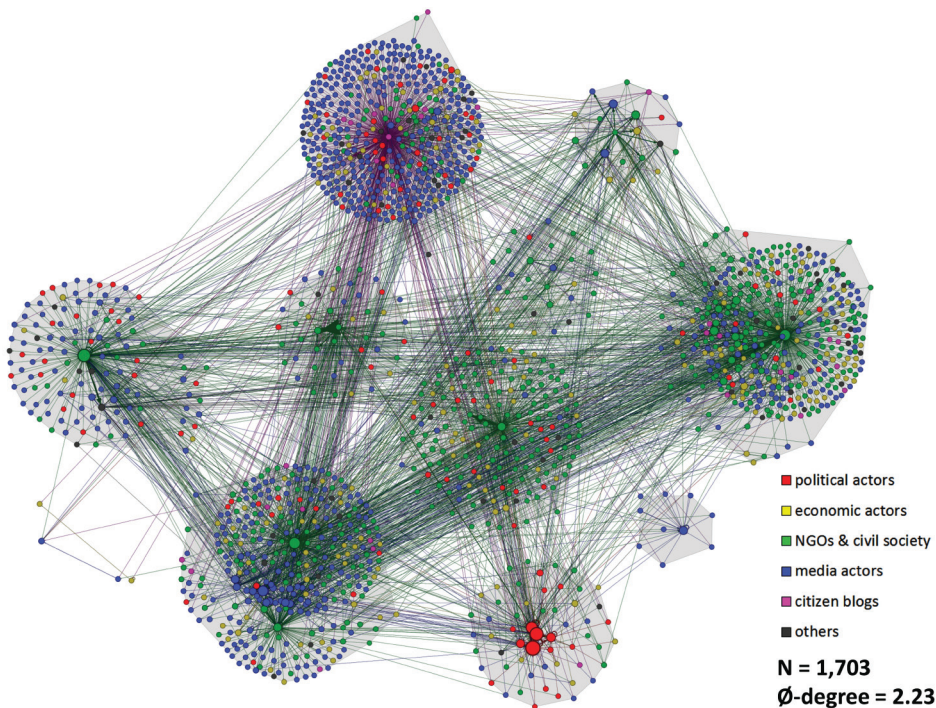


Figure 2. Network: United Kingdom

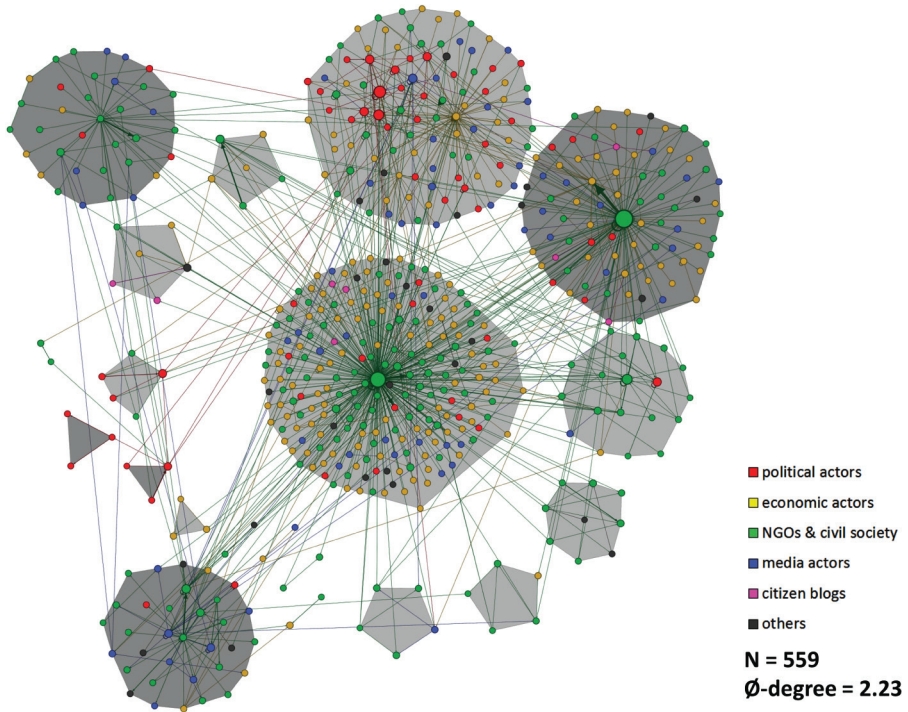


Figure 3. Network: Germany

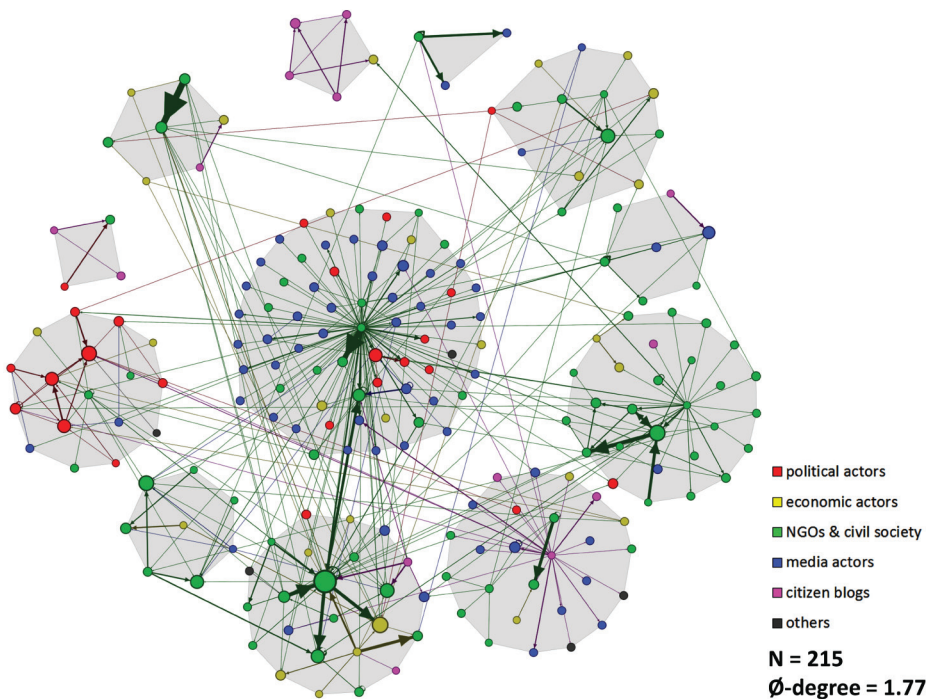


Figure 4. Network: Switzerland

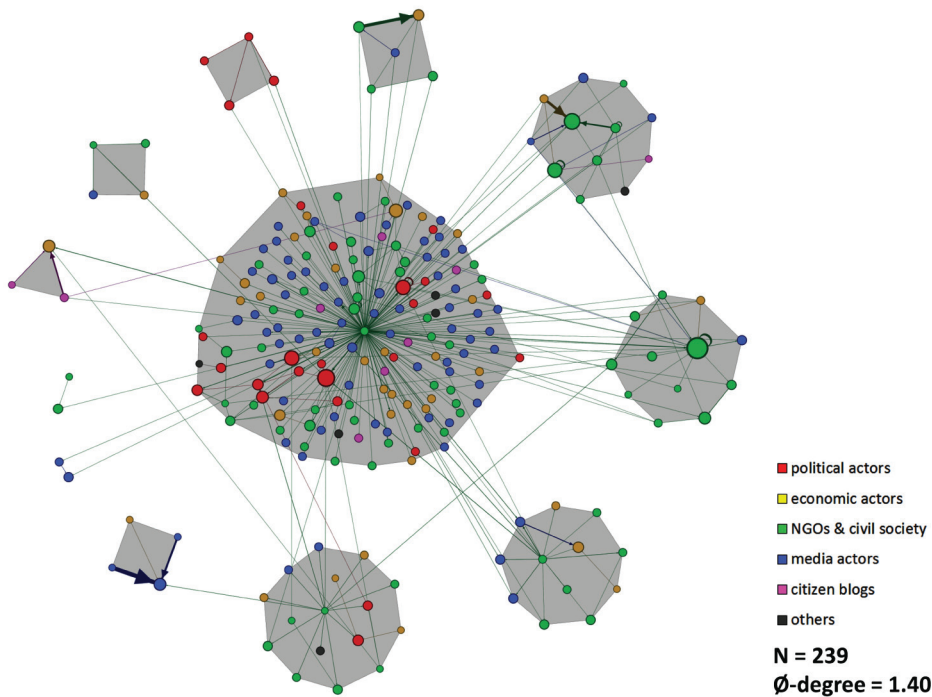


Table 2. Distribution of actors within the food safety issue networks across countries (percent)

Actor Group	GER	CH	UK	USA	Average All Countries
Political actors	11.6	10.9	11.5	7.4	10.3
Econ. actors	13.5	16.3	32.4	12	18.6
NGOs and civil society	38.6	30.1	37.6	29.8	34
Media	27.4	33.5	12	45.2	29.5
Citizen blogs	6.5	3.8	1.4	1.9	3.4
Other	2.3	2.5	5.2	3.7	3.4
# (organizations)	215	239	558	1,703	689

It also becomes evident that the media play a strong role in the networks. Overall, they represent the second largest actor group, and in both Switzerland and the US they are the most prevalent actors. While the mobilization structure behind food safety obviously depends on challenger coalitions and media support, political actors and state food policy agencies play an overall weak role in the mobilization structures of all countries. Slightly more important are economic actors, which stand out in particular in the UK network. Generally speaking, the distribution and constellations of actors reveals country-specific patterns, discussed in more detail in the next section. We start with the two pluralist democracies (US and UK) and then follow up with the countries which feature more corporatist structures of interest mediation (Germany and Switzerland).

Table 3. US adjacency matrix by actor group

	Political Actors	Econ. Actors	NGOs and Civil Society	Media	Citizen Blogs	Others	Total
Political actors	1.5	0.2	0.4	0	-	0.0	2.1
	(58)	(6)	(14)	(1)	-	(1)	(80)
Econ. actors	0.8	0.7	1.8	0.7	-	0.1	4.1
	(29)	(26)	(68)	(27)	-	(4)	(154)
NGOs and civil society	5.1	6.6	23	22.4	0.8	1.7	70.3
	(194)	(249)	(873)	(850)	(30)	(65)	(2,261)
Media	2.1	1.3	5.1	6.1	0.1	0.4	15.2
	(80)	(51)	(195)	(230)	(5)	(15)	(576)
Citizen blogs	1.4	1.3	1.5	11.5	0.3	0.4	16.5
	(53)	(50)	(57)	(437)	(13)	(17)	(627)
Others	0.3	0.2	1.2	0.8	0.1	0.2	2.7
	(12)	(9)	(44)	(30)	(2)	(6)	(103)
Total	11.2	10.3	32.9	41.4	1.3	2.8	100
	(426)	(391)	(1,251)	(1,575)	(50)	(108)	(3,801)

Note: The interlinking matrix indicates the percentage of all links that are sent from the sending actor group (rows) to the receiving actor group (columns). The absolute number of respective hyperlinks between actor groups is in parentheses.

Table 4. UK adjacency matrix by actor group

	Political Actors	Econ. Actors	NGOs and Civil Society	Media	Citizen Blogs	Others	Total
Political actors	3.8	-	0.6	0.1	-	0.1	4.6
	(37)	-	(6)	(1)	-	(1)	(45)
Econ. actors	5.1	4.5	7.7	2.7	0.1	0.8	20.9
	(50)	(44)	(76)	(27)	(1)	(8)	(206)
NGOs and civil society	7.1	16.6	33.8	6.9	0.6	2.9	68
	(70)	(163)	(333)	(68)	(6)	(29)	(669)
Media	0.5	0.2	2.3	1.4	-	-	4.5
	(5)	(2)	(23)	(14)	-	-	(44)
Citizen blogs	-	0.2	0.1	0.2	-	0.1	0.6
	-	(2)	(1)	(2)	-	(1)	(6)
Others	0.2	0.4	0.8	-	-	-	1.4
	(2)	(4)	(8)	-	-	-	(14)
Total	16.7	21.8	45.4	11.4	0.7	4	100
	(164)	(215)	(447)	(112)	(7)	(39)	(984)

Note: The interlinking matrix indicates the percentage of all links that are sent from the sending actor group (rows) to the receiving actor group (columns). The absolute number of respective hyperlinks between actor groups is in parentheses.

Table 5. German adjacency matrix by actor group

	Political Actors	Econ. Actors	NGOs and Civil Society	Media	Citizen Blogs	Others	Total
Political actors	5.3	0.8	0.8	-	-	-	6.8
	(20)	(3)	(3)	-	-	-	(26)
Econ. actors	1.1	1.3	4.2	-	-	-	6.6
	(4)	(5)	(16)	-	-	-	(25)
NGOs and civil society	7.4	6.8	36.6	18.4	0.5	0.5	70.3
	(28)	(26)	(139)	(70)	(2)	(2)	(267)
Media	1.1	-	2.9	1.1	-	-	5.0
	(4)	-	(11)	(4)	-	-	(19)
Citizen blogs	1.1	1.1	2.1	3.7	2.4	0.5	10.8
	(4)	(4)	(8)	(14)	(9)	(2)	(41)
Others	0.3	-	0.3	-	-	-	0.5
	(1)	-	(1)	-	-	-	(2)
Total	16.1	10	46.8	23.2	2.9	1.1	100
	(61)	(38)	(178)	(88)	(11)	(4)	(380)

Note: The interlinking matrix indicates the percentage of all links that are sent from the sending actor group (rows) to the receiving actor group (columns). The crude number of respective hyperlinks between actor groups is in parentheses.

Table 6. Swiss adjacency matrix by actor group

	Political Actors	Econ. Actors	NGOs and Civil Society	Media	Citizen Blogs	Others	Total
Political actors	4.5	-	-	-	-	-	4.5
	(15)	-	-	-	-	-	(15)
Econ. actors	0.9	1.2	2.1	0.3	-	-	4.5
	(3)	(4)	(7)	(1)	-	-	(15)
NGOs and civil society	11.3	11.3	32.8	26.3	2.1	1.5	85.4
	(38)	(38)	(110)	(88)	(7)	(5)	(286)
Media	0.3	0.6	2.1	1.2	-	-	4.2
	(1)	(2)	(7)	(4)	-	-	(14)
Citizen Blogs	-	0.9	0.3	-	-	-	1.2
	-	(3)	(1)	-	-	-	(4)
Others	0.3	-	-	-	-	-	0.3
	(1)	-	-	-	-	-	(1)
Total	17.3	14	37.3	27.8	2.1	1.5	100
	(58)	(47)	(125)	(93)	(7)	(5)	(335)

Note: The interlinking matrix indicates the percentage of all links that are sent from the sending actor group (rows) to the receiving actor group (columns). The crude number of respective hyperlinks between actor groups is in parentheses.

## United States

Due to the size of the country, the issue network of US challengers on the Internet stands out as the largest of our study. It contains 1,703 nodes and 3,801 ties, thereby exceeding the European networks by far. It also features a slightly denser interconnectedness, with an average degree of 2.23. In the US, almost half of all actors in the network are media organizations (45.2%), whereas 29.8% of the nodes belong to NGOs and civil society actors. This clearly indicates that to push the issue and gain attention for food safety, the challengers must team up with the mass media. Interestingly enough, alternative venues for communication such as citizen blogs are a rather marginal actor group (1.9%). Moreover, economic actors (12%) and political actors (7.4%) show low representation, at least compared to the European cases. This means that they are not addressed as coalition partners in the mobilization behind the issue.

If we look at the coalition structure, we find that the low representation of citizen blogs is contrasted by their centrality and activity in the network. Thus, citizen blogs feature a high level of activity in that they send 16.5% of the overall amount of links. To a large degree, this can be attributed to one blog, the *barfblog*, which is an information platform on food production and consumption originally sponsored by food specialists at the University of Kansas. This single blog strongly links to a large number of other actors, especially media organizations. What is more, the interlinking matrix reveals that the media are to a much lesser degree the source of hyperlinks (15.2%) than they are the targets (41.4%). In the US, we see clearly that even though the media represent the absolute majority of actors in the network, they remain rather passive. We interpret this finding as an indication that they serve challengers and citizen bloggers as references and information sources rather than a motor for issue mobilization.

US civil society features a dense interconnection: They both send and receive the majority of links from within their own group. By contrast, political agencies and administrative actors draw only 11.2% of all links upon them, originating mostly from NGOs, citizen blogs, or media actors. Accordingly, their role is a passive one as they send only 2.1% of all links—they are the targets but not the source of the links, and the few connections they make remain within the political administrative sector.

The visual interpretation of the partitioned graph (see Figure 1) matches nicely with the findings described above. This is especially true for the group of political organizations. Their presence in the network is small, and they form one strong cluster (bottom of the graph) in which inter alia the *Centers for Disease Control and Prevention*, the *US Food and Drug Administration*, and the *US Department of Agriculture* are included. The other clusters are mostly initiated by civil society organizations which seek to connect to the media. Still, different interlinking patterns between the clusters can be discerned. Three clusters (one on the right side centered around the *Organic Consumers' Association* and two on the left centered around the *Center for Food Safety*, and *Food & Water Watch*), more intensely integrate the news media (such as *The Huffington Post* or *The New York Times*). In contrast, one other cluster built around the *Center for Science in the Public Interest* (in the center) features denser connections to other NGOs. We interpret these differences with respect to different strategies of civil society actors for gaining public attention.

Overall, the findings indicate a great plurality of single-issue groups dealing with food safety in the US. These groups work together in the mobilization; however, they also compete for being heard in the political process. This might explain their intense connection with media organizations, which are referenced as witnesses for food safety concerns and information subsidies.

## United Kingdom

The UK network contains 558 nodes and 984 ties (average degree of 1.76) and features an actor distribution that differs from that of the US network. Here, civil society actors are the largest group (37.6%), but they obviously do not force the connection to the media. Instead, the UK food safety challengers count on coalitions with economic actors (32.4%), which are far more present than in the other countries. Political actors make up a comparably large share (11.5%), while the representation

of citizen blogs (1.4%) is low and comparable to the US case. In the UK network, we find that after keyword-based filtering, there are still some pages that feature content dissociating from the issue of food safety. Therefore, in the network interpretation, we focus on structural rather than content-related aspects.

In the UK, like in the US, most of the links are sent (68%) and received (45.4%) by civil society actors. In contrast to the other countries, economic actors are well integrated in the NGOs' communication, as 21.8% of all links refer to them. Overall, economic actors are relatively active in link sending (20.9%); the targets of their linking are NGOs, political actors, and other economic actors. Political actors and public agencies are rather passive and isolated from the other communities, as they mainly link within their own group (see Table 4). Once again, the media are rather passive since they establish far fewer links than they receive. Noteworthy for the UK network, however, is that NGOs as well as economic actors hardly link to media organizations.

In Figure 2, we see that the network consists of five larger and ten smaller components. Three of the smaller components (on the left of the graph) represent the regional structure of the UK since there are different groupings of political actors from Scotland, Wales, and Northern Ireland. The other small components consist mainly of NGOs with varying objectives (e.g., there is one cluster at the right dealing with organic food and health issues). The big cluster in the center is formed around the NGO *Sustain*, which, just as the other big clusters, integrates various different actor groups (NGOs, economic and political actors, media). However, the relation among the different actor types also varies across the large components (e.g., the cluster on the top features a high share of political actors).

Summing up, the UK network differs from the other cases by its distinct structure and by the comparatively high prevalence of economic actors. Intriguingly, challengers and economic interest groups seek affiliations with political and administrative actors. At the same time, the media are less well integrated into the network and therefore seem to play an only marginal role.

## Germany

In the German case, the hyperlink network contains 215 organizations connected by 380 ties (average degree of 1.77). Like in the other countries, food safety mobilization on the Internet is carried by the challengers themselves—NGOs and civil initiatives make up 38.6% of all actors in the network.

In Germany, on one hand, a distribution of actors similar to that in the US is evident, since the media are strongly represented in the issue network (27.4%). On the other hand, the German network stands out by its relatively large presence of citizen blogs. With 6.5% of all actors, they are significant players in food safety online communication. The blogs are also important, since they expose a pro-active linking behavior. They are the second most important senders of links (10.8%) and cast more links than they receive (2.9%). Most frequently, they connect with media, other blogs, and NGOs. For the rest of the adjacency matrix, most of the links (70.3%) are sent by the challengers themselves, and their behavior clearly is to connect to other civil initiatives. Quite a different pattern is visible for the media, which feature the highest imbalance between incoming and outgoing links. Media serve as information sources, references, or witnesses regarding food safety, especially for challengers. Economic players make up 13.5% and policy makers and agencies 11.6% of all actors in the network. Political actors, like economic and media actors, are rather passive since they receive far more links than they send.

The German food safety network is subdivided into 12 clusters. The campaigning organization *Kampagne Meine Landwirtschaft* can be identified as the most active organization in the central cluster (in the center of Figure 3) linking mainly to established media and supranational political institutions (e.g., the *EU Commission*). Noteworthy is the presence of several quasi-homogeneous actor type clusters. Four of them are constituted by challenger organizations. These clusters map the dimensions of the German debate on food safety nicely since they center on different sub-issues. For instance, we observe a cluster which promotes slow food. Another cluster is built around the controversy over

genetically modified food and agricultural issues. Furthermore, we detect a cluster of blogs (center top of the graph) and one of ministries and executive agencies in food policy (left center).

Remarkably, the media are less well integrated in the German network than one might have thought given their representation on the overall level. They are predominantly present in the central cluster and can rather be regarded as witnesses due to their passive linking behavior. Together with the finding that the mobilization infrastructure of challengers in Germany seems to be rather fragmented into specific issues, the selective position of the media in one strong cluster is striking. The one-sidedness and the selectivity of media references lead us to the interpretation that not all actors in any sub-issue pursue the same communication strategies.

## Switzerland

The food safety network in Switzerland contains 239 actors and 335 ties (average degree of 1.4). Civil society actors make up 30.1% in the network. They are the dominant link senders (85.4%) and at the same time the most prevalent link-receivers (37.3%). What is more, they strongly link within their own group (32.8% of all links). Overall, media organizations are the most prevalent group in the network (33.5%). From the adjacency matrix (Table 6) it can be seen, however, that as in the other cases, they occupy a rather passive role as they receive far more links (27.8%) than they send (4.2%). The same passive behavior holds true for economic (16.3%) and political actors (10.9%).

The Swiss network features 12 clusters, but as shown in Figure 4, there is one strong single center of the issue network which incorporates civil society actors as well as media, economic actors, and political institutions. It is not only a cluster that builds up a strong policy community of Swiss food safety advocates but also policy makers and food industry actors. In addition to Swiss actors, it also includes actors from Germany and the EU. This cluster clearly makes up the nucleus of food safety communication and policy. In addition, there are 11 “satellite clusters.” They are mostly formed by prominent NGOs (such as *Zukunftsstiftung Landwirtschaft*, *agrarinfor.ch*, and *Greenpeace*) and their supporters. Moreover, we find one cluster (in the center right of the graph) which incorporates actors dealing mainly with agricultural affairs. Furthermore, two clusters (at the right bottom) are formed around consumers’ rights organizations. We can also identify a small cluster that includes US political actors (center upper-left), which adds some further international connections to the network.

Summed up, the Swiss network stands out by its center cluster that is occupied by a broad coalition of domestic and European actors from all societal spheres brought together by civil society which plays an active brokerage role. Provided the size of the country, it is also noteworthy that we see quite a few rather isolated satellite clusters filled with singular NGOs and civil groups. The media, as in the other countries, are rather passive references; they are well represented, however, in the center nucleus of the challenger mobilization structure.

## DISCUSSION AND CONCLUSION

The findings of our study on four challenger-induced food safety networks point to significantly different national constellations of issue mobilization on the Internet. We introduced the expectation that pluralist countries such as the US and the UK would display a coalition structure on the Internet in which challengers use media actors to push their issue into public debate. In contrast, in consensual democracies such as Germany and Switzerland, we would expect a broader spectrum of actors involved with challenger communication. Our findings confirm this expectation in the cases of (corporatist) Switzerland and the (pluralist) United States. In the US, bloggers and NGOs build a firm coalition in which they frequently refer to the media as sources to mobilize behind the issue of food safety. In Switzerland, we find that NGOs rather link up with political actors in order to move their cause. Switzerland is the only country where civil society organizations use international news media as linking targets, while the national media are holding back in the advocacy coalition.



The UK and Germany deviate from the expected pattern. Remarkably, the UK features an issue network that unites challengers and economic interest groups. In their communication about food safety, the NGOs connect to the websites of economic interest groups in order to find allies on food policy questions, while outside strategies to seek the support of the media are not relevant in their action repertoire. This finding is puzzling, since the pattern of communication in the UK features a network structure that we had rather expected in a corporatist country. One could interpret from the structure of the challenger issue network that food safety is currently not a contentious issue that is likely to be publicly mobilized. Rather it seems to be a matter of routine negotiations and policy-making on the many detailed sub-issues of a broad range of conventional actors involved.

In Germany, we find some strong challenger coalitions, intensely referring to the media, like in the US. This network pattern indicates that protest uses outside mobilization strategies to draw public attention to the issue instead of inside negotiations. This finding may be interpreted in light of the 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.

Considering EU legislation, which forms the political opportunity structure for civil society in the UK and Germany, one could argue that the impact of the Europeanization of food policy leads to these unexpected observations. While consumer rights unions and other interest groups from civil society have had major institutionalized influence on food safety policy in previous times in Germany, the shift of the decision-making arena from the national to the supranational level may have caused a weakening of civil society and resulted in communication strategies similar to those in pluralist democracies. This is also indicated by the fact that EU political actors and media actors are mainly part of the central cluster in the German network, which deals with the Europeanized area of agricultural affairs. In the UK, the specificity of the food policy regime has to be taken into account. In spite of the overall pluralist mode of interest mediation (Lijphart, 1999), Janning (2008) describes the food policy regime as a coordination regime. The Food Standards Agency (FSA), a quasi-independent governmental executive entity, has obtained a key position therein and thus became one of the main targets of both food industry and consumer rights interest groups (Janning, 2008). The inter-references of civil society, food industry and political entities online could be interpreted as a reflection of this coordination regime.

Overall, we see that the role of mass media in all countries in online food safety communication is rather passive. In agenda building, the media are not active drivers but rather passive points of reference. They are used by the challengers as opportune witnesses of arguments and therefore legitimization agencies for their cause. By contrast, in the UK, where the food safety challengers seek coalitions with political and administrative actors and economic groups, the media do not play a significant role. The findings on the media lead us to reconsider their role in agenda building models. At least, one has to be careful not to imply that the media are proactive motors in the mobilization behind an issue such as food safety.

Furthermore, we find that the scope of national agenda building and mobilization in an otherwise consensual policy field can be expanded by online communication activities—for instance, by the inclusion of international actors. In the Swiss case, the references to international media (e.g., from Germany, Austria, or the UK) open up the otherwise nationally confined debate for new actors and arguments. All in all, our study corroborates that challengers' outside communication is mainly directed to other NGOs. In food safety politics, they organize and integrate the mobilization structure, which allows them to be proactive motors of contention and politicization. With respect to the role of the media, we conclude that in countries where challengers do not find support within national policy arrangements, they more heavily connect to media online in order to legitimize their serious concern for food safety questions in public debate.

Our study represents the situation of food safety politics in June 2014 and thus provides merely a snapshot of challenger communication. We can therefore only speak of the networks as opportunity structures of mobilization and as an expansion of the issue. In order to study the process of agenda building, one would have to assess the dynamics of the network in longitudinal studies. Moreover, the analysis of actor networks needs to be complemented by researching the content and the arguments within and among the actors involved in the food safety debate and policy-making. Finally, the variation of national patterns of food safety communication makes it necessary to contextualize the findings with respect to the detailed structure of policy-making in each country.

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## ENDNOTES

- <sup>1</sup> Referring to Van Dyke and McCammon (2010), we define a *coalition* among civil society actors as two or more individual or collective actors that work together on a common task in an either loosely coordinated or more strongly formalized and organized way. In contrast, we use the term *network* in a more abstract sense, meaning a set of actors and the relations among them (cf. Wasserman & Faust, 2009, p. 20).
- <sup>2</sup> However, hyperlinks may also express criticism or negative referencing (Rogers, 2010).
- <sup>3</sup> For Switzerland, a representative survey was not available.
- <sup>4</sup> This study was conducted in the project “The impact of challengers’ online communication on media agenda-building – a comparison across countries and issues” which is part of the Research Unit “Political Communication in the Online World” funded by the German Research Foundation (DFG) and the Swiss National Science Foundation (SNSF).
- <sup>5</sup> For detailed documentation, see: [www.issuecrawler.net](http://www.issuecrawler.net).
- <sup>6</sup> This procedure led to a final list of actors, including their websites. We checked these sites for availability, whether food safety was a central topic, and if so, whether the food safety section was up-to-date.
- <sup>7</sup> We decided on a *degree of separation* of one. A higher level would have led to a network of unmanageable size.
- <sup>8</sup> The keyword filtering was conducted with *Visual Web Spider*. For detailed documentation, see: <http://www.newprosoft.com/web-spider.htm>.
- <sup>9</sup> The coding of domains was done by two trained coders; 259 domains were coded within a larger project context. The variable “type of actor” reached an inter-coder reliability of .78 (Krippendorff’s  $\alpha$ ).
- <sup>10</sup> We regard categories (3) “civil society actors” and (5) “citizen blogs” as challengers.
- <sup>11</sup> For detailed documentation, see <http://gephi.github.io/>.
- <sup>12</sup> The calculated modularity classes indicate that the density of links within a sub-community of a network is higher compared to links across the sub-communities of a network (Blondel et al., 2008).
- <sup>13</sup> We dichotomized the adjacency matrices—that is, we distinguish only between a present (1) or absent (0) hyperlink between pairs of organizations.

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## APPENDIX

Table 7. Starting URLs (source seeds) and Google search terms for their identification

<b>USA</b>	
<a href="http://www.centerforfoodsafety.org/">http://www.centerforfoodsafety.org/</a> <a href="http://www.cspinet.org/foodsafety/">http://www.cspinet.org/foodsafety/</a> <a href="http://www.foodandwaterwatch.org/food/">http://www.foodandwaterwatch.org/food/</a> <a href="http://www.organicconsumers.org/foodsafety.cfm">http://www.organicconsumers.org/foodsafety.cfm,</a> <a href="http://notinmyfood.org/newsroom">http://notinmyfood.org/newsroom</a> <a href="http://barfblog.com">http://barfblog.com</a> <a href="http://www.greenpeace.org/international/en/campaigns/agriculture/">http://www.greenpeace.org/international/en/campaigns/agriculture/</a> <a href="http://www.pewhealth.org/topics/food-safety-327507">http://www.pewhealth.org/topics/food-safety-327507</a>	
<b>UK</b>	
<a href="http://www.which.co.uk/about-which/what-we-do/which-policy/food/food-safety/">http://www.which.co.uk/about-which/what-we-do/which-policy/food/food-safety/</a> <a href="http://www.consumerfocus.org.uk/wales/policy-research/food">http://www.consumerfocus.org.uk/wales/policy-research/food</a> <a href="http://www.sustainweb.org/">http://www.sustainweb.org/</a> <a href="http://www.acornsafety.co.uk/category/food-safety-news-and-advice/">http://www.acornsafety.co.uk/category/food-safety-news-and-advice/</a> <a href="http://www.greenpeace.org/international/en/campaigns/agriculture/">http://www.greenpeace.org/international/en/campaigns/agriculture/</a> <a href="http://www.cieh.org/policy/food_safety_nutrition.html">http://www.cieh.org/policy/food_safety_nutrition.html</a> <a href="http://www.foe.co.uk/get_involved/natural_resources.html">http://www.foe.co.uk/get_involved/natural_resources.html</a> <a href="http://www.soilassociation.org/">http://www.soilassociation.org/</a>	
food safety, safe + food, food scandal, GM foods, food + consumer protection, food + consumers, food + risk, food safety + campaign, food + labelling, food safety + control	
<b>Germany (GER)</b>	
<a href="http://www.aid.de/verbraucher/start.php">http://www.aid.de/verbraucher/start.php</a> <a href="http://www.vzbv.de/Ern%C3%A4hrung.htm">http://www.vzbv.de/Ern%C3%A4hrung.htm</a> <a href="http://www.foodwatch.de">http://www.foodwatch.de</a> <a href="http://www.verbraucher.org/verbraucher.php/cat/3/title/Ern%E4hrung">http://www.verbraucher.org/verbraucher.php/cat/3/title/Ern%E4hrung</a> <a href="http://www.greenpeace.de/themen/landwirtschaft/">http://www.greenpeace.de/themen/landwirtschaft/</a> <a href="http://www.verbraucher-papst.de/category/essen-und-trinken/">http://www.verbraucher-papst.de/category/essen-und-trinken/</a> <a href="http://www.meine-landwirtschaft.de/">http://www.meine-landwirtschaft.de/</a> <a href="http://www.slowfood.de/">http://www.slowfood.de/</a>	
<b>Switzerland (CH)</b>	
<a href="http://www.konsumentenschutz.ch/themen/kategorie/lebensmittel-ernaehrung/">http://www.konsumentenschutz.ch/themen/kategorie/lebensmittel-ernaehrung/</a> <a href="http://www.konsum.ch/information">http://www.konsum.ch/information</a> <a href="http://www.greenpeace.org/switzerland/de/Themen/Landwirtschaft/">http://www.greenpeace.org/switzerland/de/Themen/Landwirtschaft/</a> <a href="http://agrarinfo.ch/category/ernaehrung/">http://agrarinfo.ch/category/ernaehrung/</a> <a href="http://www.agrarallianz.ch/">http://www.agrarallianz.ch/</a> <a href="http://www.slowfood.ch/">http://www.slowfood.ch/</a>	
Lebensmittelsicherheit, sicher + Lebensmittel, Lebensmittelskandal, Genfood, Lebensmittel + Verbraucherschutz, Lebensmittel + Konsumenten, Lebensmittel + Risiko, Lebensmittelsicherheit + Kampagne, Lebensmittel + Kennzeichnung, Lebensmittelsicherheit + Kontrolle	

Note: For each group of countries, the upper rows of the table contain the chosen starting URLs; the lower row shows the Google search terms used to find the most important civil society actors in the field of food safety.

Table 8. Issue specific keywords in English and German (search terms for Visual Web Spider)

A. Issue Label	B. Food Terms	C. Terms Related to Food Safety Problems
Food safety	Food / aliment / feed	Germ / epidemic / scare / illness / health / infected / borne / contagious / contaminated / polluted / GM food / genetical / hazard / bioengineer / harmful / scandal / hygiene / risk / EFSA / FDA / FSA
Lebensmittel-sicherheit	Lebensmittel / Nahrung / Futter	Erreger / Keim / Epidemie / Seuche / Krankheit / Gesundheits / Infiziert / Verunreinig / Kontamin / Belast / Gentechni / gefahr / Gefahr / Skandal / Hygien / Risiko / EFSA / BVL / BAG

Note: The search was performed in English and German, since both are languages of the overall research project. Some terms were cut after a certain point so as to ensure different words were tracked, e.g. a search for "genetical" may include "genetical" or "genetically." The search was performed in the following manner: considered relevant were pages that contained the term of column A or a combination of terms from columns B/C; thus, A OR ((B) AND (C)).

**Table 9. Type of actor—Coding categories for the actors associated to the domains**

Category	Description
(1) Political and state actors	All actors from politics and state, such as government, parliament, political parties, state executive agencies, judiciary, police, and international governmental organizations, are coded in this category.
(2) Economic actors	All actors from the business sector, such as firms and companies and employers' organizations. Also, trade and professional associations, employees' associations, and trade unions belong here.
(3) Non-profit actors of civil society	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, and churches and religious organizations belong here.
(4) Media actors	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.
(5) Citizen blogs	All single actors with an online presence who do not belong to categories 1-4, such as single or groups of bloggers belong here.
(6) Other actors	Actors which do not match with categories 1-5, e.g., forums, content sharing platforms, campaigning platforms, wikis, etc.; also sites which cannot exactly be identified, e.g., due to technical reasons (such as log-in protected sites without further information) or are written in a foreign language are attributed to this category.