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The roles of news media as democratic fora, agenda setters, and strategic instruments in risk governance

A double international case study on earthquake risk

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ABSTRACT

This study analyzes news media's role in governmental decision-making processes related to a gradually intensifying series of earthquakes resulting from gas drilling in the Netherlands, and catastrophic natural earthquakes in Italy. According to the risk governance actors interviewed in both cases, media play three roles, as: democratic fora, agenda setters, and strategic instruments. Media attention for risk can create ripple effects in governmental decision-making processes. However, media attention tends to be risk-event driven and focuses on direct news-worthy consequences of events. For 'non-event risks', or when news-worthiness after a risk-event fades, the media's agenda setting and democratic fora roles are limited. This contributes to risk attenuation in society, potentially resulting in limited risk prevention and preparedness. Governmental actors report difficulties in using news media for strategic communication to facilitate risk governance because of media's tendency towards sensationalism. Our research suggests that, in the governance of earthquake-risk news, media logic overrules other institutional logics only for a short while and not in the long run when the three roles of media do not reinforce each other.

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News media; risk governance; earthquakes; ripple effects; decision making processes

Introduction

News media such as newspapers, television radio and online sources play an important role in risk governance processes because they provide society with risk information about the causes and effects of risk events. Many risk researchers have studied the role of media in the social construction of risk (e.g. Gamson and Modigliani 1989). In addition, scholars have focused on media's prominent role in shaping public risk concerns, perceptions, and attitudes, and amplifying or attenuating risk signals by selecting and framing messages (e.g. Kaspersen et al. 1988; Löfstedt and Renn 1997; Bakir 2010). Less attention has been paid to media's role in risk governance processes conducted by civil servants and public bureaucracies in multi-stakeholder networks, although media in democratic countries usually report on public actors' positions and actions in governance processes, often publicly questioning them (Hood 2010). When media report the responses and repercussions in the aftermath of a risk event, they emphasize certain aspects of risks and often focus on governance actors' responsibilities and not on factual information about the risk (Renn 2008). As Howarth

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(2013) states, capturing the dynamics between political and media actors is *'the weakest link'* in research about the social amplification of risk. In this paper, the term 'media' refers to *news media* which include print media (newspapers and magazines), broadcast news (radio and television) and digital media (online, blogs, twitter, etc.).

The research question of this study is: *What is the news media's role in the risk governance decision-making process regarding earthquake risks?* In the current study, The Social Amplification of Risk Framework (SARF) (Kasperson et al. 1988) serves as a backbone for further investigation of roles that news media play in risk amplification processes in society and influence risk governance of recurring earthquakes. We will build on the three roles (democratic fora, agenda setters, and strategic instruments) for media in relation to governance processes identified by Korthagen (2015). Empirically, the study draws on two cases: 1.) a gradually emerging earthquake risk induced by human activities (gas drilling) in the Netherlands, 2.) tectonic movement of the underground in Italy caused strong, recurring disruptive earthquakes in the Italian Norcia region.

Theoretical framework

Risk governance and the social amplification of risk

Risk issues are often governed through interactive and complex decision-making processes (Renn 2008). According to Klinke and Renn (2019, p. 2), risk governance *'marks out institutional structures and socio-political processes that guide and restrain collective activities ... 'aiming to prevent and reduce negative impacts. Risk, by definition, is not only about objectivity but also about subjectivity. For example, public risk perception and acceptance of earthquake risks were shown to be more negative for human-induced earthquakes than for natural earthquakes (McComas et al. 2016). Risk governance networks therefore have to deal with perceived risk, and responses by actors in society that may deviate from expert risk assessments (Wardman and Löfstedt 2018).*

The social amplification risk framework (SARF) provides a broad conceptual framework for understanding the dynamic character of societal risk responses (Kasperson et al. 1988). Risk amplification entails both processes which intensify and weaken risk attitudes and responses in society (Kasperson et al. 1988; Rip 1988; Fjaeran and Aven 2019). In the first stage of SARF, risk events, situations, or objects may emerge and obtain *signal value*, meaning that an issue becomes more or less perceived and attributed as a risk for society. A flow of messages can arise and images may spread in media, whereby risk as a social construct accrues further salience and significance. This can stimulate concerns in the public sphere and in the economic or political arena, and can affect institutional processes and structures in the governance network. These *ripple effects* go beyond the direct harm of the risk event and include e.g. political debates, governmental decisions, and changing economic activities (Kasperson et al. 1988). This also entails responses and repercussions about failures to prepare for events predicted by scientific risk assessors (Poumadère et al. 2005). Burns et al. (1993) argue that public responses in various cases appear to be determined by perceptions that risk are caused by managerial incompetence.

Signals of substantial risks for society are not always intensified. They can also be weakened, a process called attenuation. Attenuation can lead to 'doing-nothing' in risk governance (Fjaeran and Aven 2019).

Three news media roles in risk governance processes

News media play an important role in the deliberation and social construction of risk, and therefore influence citizens' risk perception and concerns (Renn 2008; Walker et al. 2010; Bakir 2010). Korthagen (2015) identified three roles for media in governance processes which are distinguished analytically, but interact and may reinforce one another in practice. These are media as democratic fora, agenda setters, and instruments for strategic communication.

Media as democratic fora

Media provide a platform for informing citizens (Bakir 2010), disclosing information about a risk event when personal experience is lacking (McCombs 2004), and enabling public discussion (Schudson 2008). Media's watchdog function enables citizens to monitor governmental performance (Aalberg and Curran 2012) and hold government accountable for their risk governance (Iyengar and Simon 1993). Critical media can be beneficial, when their attention helps governance networks to function better (Norris 2014).

Media as agenda setters

Risk issues that attract a lot of attention become a prominent concern for society (McCombs 2004), and this focus influences public opinion (Scheufele and Tewksbury 2007). By selecting and framing issues that are relevant (for stakeholders) in society, media have an agenda-building role. Media thus can put risk issues on decision makers' agendas (Elder and Cobb 1983; Baumgartner and Jones 2009; Van Aelst and Walgrave 2011).

Media as instruments for strategic communication

News media have a large reach in society and can be used by actors within stakeholders to communicate their messages. Kepplinger (2007) showed that media reports influence actors' awareness, cognitions and emotions. Media can also be used to stimulate or discourage individual and group risk behavior (Kasperson et al. 1988; Bakir 2010).

Media logic, mediatization and risk governance

In all three roles, news media operate through a specific *media logic*, translating and transforming information in specific ways. Media logic implies that reporting tends to focus on negative news, human interest stories, and drama (sensation) (Bennett 2009), thus shaping risk information. Opperhuizen, Schouten, and Klijn (2019a) showed that media logic shapes Dutch news media reports on gas-drilling induced earthquakes. Kepplinger (2007) and Vasterman (2018) argued that news media may become very influential in the social construction of risk, particularly when an issue causes a media hype. Kepplinger (2007) argued that media logic may cause journalists to become part of the risk issue themselves and create reality on their own. The leading perceptions shaped by media, including realities created by journalists, are not without consequences and influence decision-making processes directly (Wardman and Löfstedt 2018). Scholars even speak of the mediatization of politics (Mazzoleni and Schulz 1999; Strömbäck and Esser 2009; Hjarvard 2013).

Thus ripple effects generated by media reports can influence risk governance processes (Renn 2008). Versluis et al. (2010) state that attenuation of risk in society may lead to the neglect of risk governance preparedness in the long run. Poumadère and Mays (2003) describe that after the risk perception about heat waves changed and initiated the social amplification of the risk, risk governance measures were rapidly taken. However, as time went on media attention faded and planned risk preparedness activities were cancelled. Fjaeran and Aven (2019) argue that for 'non-event-risks' the *modus operandi* is often societal and managerial 'non-response'. In addition, risk managers can play a substantial role in the attenuation of risk by not responding to risk signals from experts (Poumadère et al. 2005). Although mediatized amplification and attenuation of risk have important consequences for risk governance networks, this issue has not yet been systematically studied in the light of SARF.

SARF has been criticized for its lack of precision and theoretical foundation, particularly regarding the creation of ripple effects, or the lack of it (Rip 1988). According to Rip (1988) it is unclear 'what' creates the ripples; is it only the event itself such as an earthquake, or also the

perception of the risk? Rayner, et al. (1988) also criticizes SARF, arguing that societal risks can also be mentally constructed without events. Busby and Onggo (2013) mention that subjectivity is critical for the impact risk signals have on society. In the study at hand both the risk (particularly the adverse consequences of events) and the risk signals (influencing perceptions and responses) can be amplified or attenuated, for instance after reframing or novel interpretation of available information. News media play an important role either by initiating social amplification processes, or by amplifying ripples previously created by risk events or perceived hazards. .

Methodology

Case selection

This research involves a double, international case study of earthquake risks in the Netherlands and Italy, but we do not investigate national differences between Italy and the Netherlands.

The earthquake risk in the Netherlands exemplifies a gradually evolving, human-induced environmental risk. Prior to the gas extraction started in 1963, the area was aseismic, but decades of gas extraction from the early 1990s onwards resulted in a slight but gradually increasing frequency of earthquakes with higher magnitudes (Vlek 2018). Until 2012 however, the earthquakes were not a strongly debated risk issue in the news media (Opperhuizen, Schouten, and Klijn 2019a). This changed when an earthquake ($M=3.6$) struck the region that caused much more damage to houses than previously experienced. Earthquake risk then became a prominent issue in the news media and on the policy agenda (Opperhuizen, Klijn, and Schouten 2019b). This Dutch case was selected because (a) it exemplifies the risk of earthquakes as a direct consequence of human action, (b) the earthquake risk arises more from the high frequency and less from the (disruptive) magnitude of particular earthquakes, and c) news media played an important role in raising social and political awareness of the risk (Van der Voort and Vanclay 2015).

The second case is located in an Italian region with a long history of seismically activity. In 2016, strong earthquakes hit the Umbria, Lazio, Abruzzo, and Marche regions (average $M=6.2$); and in 2017 another series of earthquakes (average $M=5.3$) occurred. The media reported elaborately on the earthquakes but were accused of misleading the public with incomplete, propagandistic, and contradictory information, causing fatal consequences (Bock 2017). The broad media coverage also negatively influenced an important economic sector: tourism. This Italian case was selected for three main reasons: (a) it exemplifies natural earthquake risks and thus contrasts with the Dutch human-induced earthquake risks, (b) the earthquake risk arises more from the disruptive magnitude and less from the frequency of earthquakes, and c) news media played a substantive role in raising risk awareness.

Interviews

Thirty-three semi-structured interviews were conducted (18 in the Netherlands and 15 in Italy) with representatives of the most important national and local actors involved in the risk governance network at various government levels, multiple local citizen groups, and experts. Appendix A provides an overview of the organizations involved. The respondent sample reflects the various interests that stakeholders in the governance network have regarding risk governance and media coverage, thus preventing a one-sided view of the cases. There were no interviews with journalists however, or other actors outside the (broadly demarcated) governance network. Thus, this paper analyses the role of the media on the basis of sources external to the media themselves.

The semi-structured interviews were tailored to each interviewee's role in the risk governance process. Confidentiality was guaranteed to encourage respondents to discuss sensitive topics. A codebook based on the theoretical roles of news media in governance processes was used for the coding process (see Table 1).

Table 1. Codes for analyzing media roles.

Concept	Codes for media role
Democratic fora	Actors publicly discuss risk issues in media and obtain their democratic information from media Citizens' ability to 'check' risk governance processes and their performance through media Misbehavior or unfavorable decisions are translated into media attention. The media function as watchdog
Agenda setter	Critical media attention helps the governance network to function better Media put risk issues on the decision makers' agenda. Media select and frame risk issues that are relevant (for groups) in society The way media select and frame a risk issue influences perception and acceptance of the risk Risk issues that attract a lot of attention become a prominent concern for society
Strategic instrument	A shift in media attention (amount and content) can disrupt the decision-making process Media are used to transmit risk information between the risk governance network and others in society Actors within the risk governance network use media as transmitting station for information Media messages impact decisions Media messages are used as instruments to influence individual risk behavior

Empirical results

Democratic fora in the Dutch case

In the Dutch case, the respondents agreed that, in general, the media serve as democratic fora, acknowledging that citizens' voices are represented. Local groups, however, were critical of how the media chose their stories and images. Others argued that their voices were less heard than other citizens' voices, and that different sides of the story were not sufficiently reflected. Hence, they also reflected critically on the democratic fora role played by the media. Actors tried to share facts and explanations with the media, but these were often ignored; in their view, media prefer sensational news. According to several interviewees, some (especially local) media tended to focus on citizens' feelings, adopting an activist attitude in messages:

...by all means, the tone of media shows what society thinks, expects, and wants to hear in this area.

It is difficult for actors to publicly discuss risk issues with citizens via the media. Interviewees find it hard to enter the public debate because it is so complex. Consequently, they feel unheard by the governance network and are dissatisfied. Participation in democratic fora is tough for some actors because:

... It is operating in a minefield, with very complicated matters to explain simply.

According to a majority of respondents, the media should be more critical and more informative because that is essential for the proper functioning of society. In their view, media focus strongly on heat-of-the-moment issues instead of on proper research journalism. Respondents report a situation whereby risk issues regarding earthquakes seem to be not newsworthy enough. The lack of newsworthiness is seen as dangerous, because the media's control function is important for society as well as for the risk governance network.

... they look over your shoulder, and we have to explain or disprove questions correctly.

Democratic fora in the Italian case

In the Italian case also, the media as democratic fora are both acknowledged and criticized by respondents. The media function well by quickly informing relevant parties about public questions, needs, and issues voiced by citizens.

... we [local citizens] knew what the problems were and they [the media] were able to bring them to the attention of relevant people.

Respondents generally see the dialogue between citizens and the media as beneficial for general discussions, sometimes leading to improvements in the decision-making process. Media attention also helps to improve actors' own decisions and actions. Because an earthquake is not an ordinary situation and various solutions must be found for a complex set of problems caused by the hazardous event, a good evaluation by the media helps to improve decision making and detect possible flaws according to interviewees.

Some actors mentioned that media help to keep a check on the risk governance process, enabling citizens to monitor policy decisions:

... Moreover, the press is also an instrument to draw attention to the area, so that the administration acts in the public interest without unjustified delays. What matters is being precise, pinpointing responsibilities, and asking those in charge to make better interventions.

However, respondents formulated two main critiques; i) media do not persist in reporting in the long run, as directly after an earthquake, there is plenty of media attention because of the dramatic nature of the event, but then the media fail to follow up on successive developments. ii) media show unrealistic images and stories, regularly quoting people with bizarre opinions. Multiple respondents argued that the incorrect information, *self-managed reality*, provided by media does more harm than good to citizens, because the media often adopt a sentimental approach with superficial analysis of the problem definition. Consequently, the '*real problem is overlooked*'. The negative and complex spread of information makes it more difficult to improve risk governance decisions. A respondent from a citizens' organization said:

... Being destructive is very easy, whereas being constructive is very difficult. There are many problems, I am not denying it, but you also have to look for other stories, be proactive... what was missing was investigative journalism.

It was argued that the incorrect information and sensational messages provided by the media is harmful for the authorities and also negatively affects communities.

Agenda setting in the Dutch case

The media's role as agenda setter is acknowledged, but the respondents agreed that, in the earlier years of the earthquakes, media did not fulfil this role. For a long time, media did not take the risk of earthquakes seriously.

... In Groningen, there was a silent disaster.

According to several respondents, the enormous economic revenues from gas made it difficult to put the risks on the agenda. Local interest organizations tried to '*keep the fire heated*' by writing about certain aspects of the risk issue, but it was hard to get these messages across in the media, respondents stated. Agenda setting is only possible by highlighting stories that influence people's risk perceptions:

... it gives the feeling a disaster is increasing when everyone talks about it.

Respondents' opinions differ about media's influence on risk perception and acceptance. Some argued that media attention is positive because it puts social issues on the governance agenda. Others believed that the media do not create real awareness at societal level, because the distance between the risk and their audience remains large:

... Apparently, you have to experience it yourself to know what this risk is really about, so it is still a regional problem and not a national problem.

Only a negative and sensational story may break this frame according to some interviewees: *'this risk issue is not mediagenic enough'*. This limits the media role as agenda setter for the national policy agenda according to respondents.

Actors indicated that, when the media put the spotlight on earthquakes in 2013, the topics also appeared on the political agenda. It *'is a chicken and egg story'*, and it remains unclear whether media attention or political debate came first, but they definitely reinforced each other. Media's focus on a certain issue indicates a socially sensitive issue, and politicians can hardly neglect it.

...media ask questions about the decision-making process..., When there is no media attention, a decision maker will analyze the situation quietly, but when the media address the issue, everybody directly wants to see a policy response.

Increased media attention leads to simplistic calls for action, a respondent argued. Actors noted that the economic interest in gas supply was suddenly replaced on the governance network's agenda by the need for action. Multiple respondents find that politicians are sensitive to hypes, and one respondent underlined that this may even be dangerous: *'it has all become short-sighted, this is a pity or it is even a dangerous development'*. Some respondents indicate that too much media attention leads to overreactions, with negative results when they are not in line with carefully defined priorities:

... It is a toxic mixture of politics and media that creates a certain pressure that is so big that it is almost impossible to cope with.

All respondents agreed that the media affect the political agenda directly, but they doubted the impact in the long run.

Agenda setting in the Italian case

Actors note that the way in which media informed and framed information played a crucial role in the Italian governance network during the emergency phase. However, media reporting was confusing also. It informed actors about the severity of the situation, and underlined that the emergency required serious attention.

... This showed that media only come after the first phases of an emergency, and it's difficult to rely on news.

Governance network actors agreed that, after the emergency phase, the media had an agenda setting role, showing major concern towards society and influencing the activities of several actors within the network. *'The political agenda was directly affected, which unfortunately did not translate into many immediate and concrete actions.'* Actors saw media as a necessary institution for regional visibility, indicating that many representatives of Italian institutions visited the area during the emergency phase. However, this visibility was temporary, *'if they stop talking about it, the State may lose interest in solving the current problems, which have become even worse'*. Media and political attention decreased while citizens continued to face difficulties. The falloff in attention was unfortunate, because many more things remained to be done, and many people still faced difficulties years later.

Additionally, according to the interviewees, media reports were sensational as sometimes they gave the idea that the entire province was permanently subject to earthquake shocks. The number of reports and the framing repulsed citizens and tourists according to interviewees, which hindered economic recovery.

Respondents indicated various expectations of the media as agenda setters. First, they indicated that there should be more sensitivity and precision in media reports, to avoid indirect damage. Second, a more positive image of the region should be projected. In addition, several interviewees said that the media do not highlight the positive attributes of the region. Positive

news would create more trust in the region, e.g. more jobs would be created. Another respondent adopted a positive tone regarding media as agenda setters:

... we wouldn't be able to solve the issue without the help of newspapers or television. We really were able to speak at national level about what was a major problem for us at that moment. Media sometimes are necessary to raise awareness about critical issues of the earthquake.

Strategic instrument in the Dutch case

Respondents reported that they try to use the media as strategic instruments to tell their own story to serve their own interest. However, the reasons for using the media as strategic instruments differed between actors. National and local governments employed media to announce decisions, arguing that they use the media to be transparent. At the same time, they acknowledge the difficulty of communicating about decisions in an easy and understandable way. Citizens' groups and local authorities mainly employed the media to explain what citizens should do in specific situations for example by providing information about the situation and communicating action plans to stimulate individual risk reduction behavior. Besides the positive aspects of transparency, there are also doubts about transparency and whether or not becomes the main focus of the network, i.e. causing goal displacement.

The media also functioned as strategic instruments for actors who wanted to communicate with the public, independent of other parties in the governance network. NAM, Safety Region, and KNMI argued that their independent role is extremely important and therefore they wanted independent communication messages. They were afraid that, if they sent a message jointly with another actor in the network, trust in their independence would be affected.

... you have to be very clear about what you are doing to ensure that you are not equated with other actors within the network. The way we communicate and intensify our communication we show people that we work in a transparent way, and do not have a hidden agenda.

Other actors argued that the governance network should think collectively about when, how, and by whom a message is spread, bearing in mind that everybody needs their 'success' and 'you have to grant one another something'. In their view, the governance network needs to make a plan and communicate strategically in a joint manner. Having one collective communication strategy is challenging according to the respondents however, because it conflicts with network actors' individual aims and interests.

Multiple actors mentioned that they change their strategy regarding media use over time. For example, the Ministry changed its strategy to show more commitment. This is a change from a decide-announce-defend strategy to a more interactive strategy with two-way communication:

... We are a techno-scientific department, turned inwards. Used to taking a decision with a group of people together with politicians and then executing the decision to make it known outside. It was new to talk about decisions with the environment. In the beginning, the department found it first surprising that the rest of the world did not understand what brilliant, well-balanced decisions were taken here.

The Ministry publicly communicated that there had been a governance failure, thus acknowledging what citizen groups had long been arguing. However, showing commitment through the media was not enough for local authorities and citizens' groups. They argued that showing commitment was nice, but they judged the Ministry on its actions in the decision-making process. This illustrates how strategic media communication may not be sufficient to gain support, if it is not backed up by concrete action. Some actors argue that long and consistent critical deliberation in the media affects decision-making processes according to actors. To illustrate this, they report that after severe criticism in the press, the gas industry (NAM) was removed from damage-compensation claim procedures.

Strategic instrument in the Italian case

In Italy, the media were used as strategic instruments for different reasons. First, media were used by authorities to collect and streamline the diffuse information that emerged during the catastrophic earthquakes and directly afterwards. This led to a fast exchange of information but also a diffuse information flow. Second, media were strategically used to highlight the need for resources (financial) in the area. However, in asking for donations, the authorities found it difficult to project a balanced picture in the media:

... We wanted to highlight that an earthquake had occurred and ask for help to show the most dramatic moments and difficulties, where people were frightened, the people complained about this. So, if we ask for help, reality must be shown as well.

Third, in the period after receiving donations and the reconstructing phase, the media were used to communicate to the donors the measures taken by the municipality: *'we were able to show the whole world what we were doing'*. Thus, media facilitated transparency in the decision-making process. In this case also, the negative side effect of transparency was mentioned: transparency can lead citizens to become critical of officialdom.

Further, media were strategically used to promote the region after the earthquakes to minimize indirect effects, like the decrease in tourism. Many respondents mentioned that using (social) media to show the damage caused by an earthquake created a negative impression of the region. Therefore, they used media for promotion and became extremely aware of the content used. For example, the word 'safety' was not mentioned because it emphasizes the disaster instead of promoting the region.

Discussion

The results show that news media (print, broadcast and online) in The Netherlands and Italy play roles as democratic fora, agenda setters, and strategic instruments in earthquake risk governance processes although differences between the cases exist (see [Tables 2–4](#)).

The interviews show that, in both cases, media play an important role as democratic fora in the earthquake risk governance process by representing citizens' voices, thus enabling citizens to raise certain risk issues. Media also transmit and amplify risk information and stories, for example from a local to a national scope. This is consistent with previous research (McCombs 2004; Schudson 2008). However, one major problem that Italian and Dutch interviewees report is that media are little interested in factual information, as also reported by Gearhart, Adegbola, and Huemmer (2019). Therefore, actors face difficulties entering the media and contributing to in-depth democratic deliberations with factual risk information.

In the Italian case, media reports in the emergency phase influenced risk perceptions and were used by actors within the network to determine the size of the disaster. The *'brute reality of the physical consequences'* (Busby and Duckett 2012, 1066) was the dominant media interpretation of reality in the short run. Media served mainly as a source of information for citizens about adverse social, economic and cultural consequences. The agenda setting role seems marginal in the long run, and media appears less a forum for societal debate about interests, probably because the disruptive impact of the earthquakes left little room for other foci.

Gas drilling in the Netherlands created a long series of mild trembles (mainly magnitudes less than 3) which were often not noticed by citizens. The Dutch earthquake risk shows similarities with what Fjaeran and Aven (2019) classify as 'non-event risks' because the risk can be referred to as 'risk and uncertainty source' which results in no response of risk management in the political arena as was observed for decades. In the absence of a major event, media did not create ripple effects for long periods of time, risks are actually attenuated by the news media. Similar to catastrophic event in the Italian case, the democratic fora role is limited as the newsworthiness

Table 2. Comparison earthquake risks and media's democratic fora role.

Democratic fora	Dutch case; gradually emerging earthquake risk induced by human activities	Italian case; disruptive earthquake risk caused by natural processes
	<p><i>Manifestations:</i></p> <ul style="list-style-type: none"> • Citizens' voices are represented • Critical reflection on decision making facilitated after serious risk event • Local newspapers give space for critical essays on risk governance <p><i>Limitations:</i></p> <ul style="list-style-type: none"> • Dissatisfaction about media focus, based on their own values and logic • Media logic often overrides factual accounts, causing: <ul style="list-style-type: none"> – Complexity of the policy issue, making it hard for citizens to enter the media agenda – Distrust in network governance, affecting public discussion 	<p><i>Manifestations:</i></p> <ul style="list-style-type: none"> • Citizens can check risk governance process because media place spotlight on reconstruction process • Reports by media facilitate actors' own decision making and actions <p><i>Limitations:</i></p> <ul style="list-style-type: none"> • Watchdog function and transparency only directly after a physical risk event and not in the long term, with limited opportunities for social deliberation • Sensational framing focuses on citizens' negative stories, leading to unrealistic images and stories with biased problem definitions

Table 3. Comparison earthquake events and media's agenda setter role.

Agenda setter	Dutch case; gradually emerging earthquake risk induced by human activities	Italian case; disruptive earthquake risk caused by natural processes
	<p><i>Manifestation:</i></p> <ul style="list-style-type: none"> • Media enhance policy attention and influence the political agenda for a short period <p><i>Limitations:</i></p> <ul style="list-style-type: none"> • No influence on agenda setting before serious earthquake happen • Agenda setting often results in short political (over) reaction, rarely in direct management decisions • Agenda setting leads to simplification and short-sighted views and stimulates goal displacement • Weak agenda setting effects at national level; the issue remains a local problem 	<p><i>Manifestation:</i></p> <ul style="list-style-type: none"> • Information provided about emergency phase, thus helping determine policy priorities • Local visibility generated for problem and solutions stimulated (e.g. financial support) <p><i>Limitations:</i></p> <ul style="list-style-type: none"> • Incorrect information by media results in errors in national and local governance actors' agenda • Limited effects in terms of concrete reconstruction actions • Visibility is used for politicians' own goals, i.e. political promotion • Agenda setting is prominent in emergency phase • Sensationalism and negative images cause negative effects on risk perception and regional tourism economy

of non-event risk is low. However, particularly after 2013, media attention focuses on earthquakes as an issue of social interest and conflicts. Actors strategically use media's democratic forum role to promote their own values and interests, and to explain and defend their opinions, responsibilities, and interests. The conflicting interests create discussion and ambiguity about possible mistakes and misbehavior, which are important for social amplification processes according to Poumadère and Mays (2003).

Overall, the cases suggest that the watchdog function in its own right hardly affects risk management decisions in the long run. The role of media in earthquake preparedness preceding hazardous events especially appears to be low, even when catastrophic events like the Italian

Table 4. Comparison earthquake events and media’s strategic instrument role.

Strategic instrument	Dutch case; gradually emerging earthquake risk induced by human activities	Italian case; disruptive earthquake risk caused by natural processes
	<p><i>Manifestation:</i></p> <ul style="list-style-type: none"> • Promotion of actors’ own values and interests • Used for transparency about decision-making process • Used to explain decisions to the broader public • Help in the simulation of individual risk behavior • Used to clarify actors’ roles • Used for showing commitment from the network towards citizens <p><i>Limitations:</i></p> <ul style="list-style-type: none"> • Simple transmission of messages is difficult • Sensationalism is required to attract media attention • Goal displacement can occur as a consequence of the call for more transparency • All the actors have their own media strategy, making a collective communication strategy challenging 	<p><i>Manifestation:</i></p> <ul style="list-style-type: none"> • Used for sharing knowledge • Used for influencing resource allocation • Used for transparency about the decision-making process • Help in promoting the region <p><i>Limitations:</i></p> <ul style="list-style-type: none"> • Focus on negative stories makes it hard to report positive and nuanced stories

earthquakes can be predicted and expected. This finding amends and specifies theory arguing that media generally function as a watchdog (Iyengar and Simon 1993; Aalberg and Curran 2012).

The limited role of media as democratic fora can be explained both by the complex nature of earthquake risk governance and by the logic of contemporary media. Firstly, earthquake risk and its governance are so complex that it is difficult for media to cover techno-scientific elements and make the issue salient for citizens to enter the public discussion. This easily leads to oversimplification by media and hampers social groups that try to counter unfavorable decisions or wrongdoing. Secondly, media logic narrows the focus to newsworthy aspects of risk, thus amplifying sensational, dramatic, and negative aspects and attenuating others (Altheide and Snow 1979; Binder et al. 2014). Particularly the sensation and drama focus of media, the negative framing of the societal consequences of earthquakes, and mediatization elements were generally disliked and perceived as counterproductive by network actors. They complained that the media are not seriously interested in facts, and develop a *self-created reality*. This is in line with previous studies by Kepplinger and Habermeier (1995), and Vasterman (2018). The consequence is, according to the network actors, that the power to improve decision making in the risk governance network is undermined. The media’s framing and logic may cause the actual risk to be overlooked, and generate negative ripple effects with adverse consequences for risk governance as Rip already noted in 1988.

Regarding the agenda setting function, the findings indicate that media in both cases do set the agenda in the short run, but not necessarily in the long run because media attention tends to fade after some time. Consistent with our results, Kahlor et al. (2019) also shows that, in the USA, media reporting about the risk of earthquakes related to gas and oil fracking was limited and faded rapidly after events. According to the risk governance network actors in our cases, the political arena was particularly sensitive to a media hype, as has also been reported by Vasterman (2018). The short duration of media attention makes it possible for governance network actors to ‘ignore’ the media attention after a short period, and return to business as usual,

without changing their risk governance processes. This is an example of 'doing-nothing' in risk governance (Fjaeran and Aven 2019, Poumadère and Mays 2003). Also Versluis et al. (2010) state that attenuation of risk in society may diminish risk preparedness, and that signals for the long run may be neglected.

The multiplicity of opinions related to the democratic fora role, in combination with the lack of interest in factual information, seriously hindered use of the media's strategic role by network actors. As various actors stated, they were not successful in developing coherent strategies to use the media to support (collective) decision making and activities to deal with the risk events – despite some network actors indicated that they individually changed their media strategy in an attempt to make better use of media. In the Italian case, strategic use of media was successful in drawing attention to the financial problems and generating support and donations for recovery. However, the Italian media's strategic role in the long term was limited, and the focus on negative stories made it difficult for the risk governance network to expose the public to positive stories about reconstruction and social resilience. This secondary ripple may have had negative consequences for the reconstruction of the region, for instance through the negative impact on tourism.

Theoretically, the democratic function and strategic roles of the media are not independent from each other. For example, the strategic role can be used to influence public discussions. Thus, both roles can provide a foundation for the agenda setting in the long run. Amplification and prolongation of messages about the risk as social construct and managerial competence may even affect processes and structures of institutions of the risk governance network. This aligns with the notion that ripples reflect complex patterns of selective attenuation and amplification (e.g. Kasperson et al. 1988). However, in our cases actors were not very successful in strategically using the media to influence the political agenda in the long run beyond clear risk events.

Dutch media seemed to be interested mainly in social elements of the earthquake risk, whereas the risk governance experts were more interested in the technical or factual elements. This is consistent with existing literature showing that media often report on items relating to people's risk perception and attitudes, for example reports mention anger and blame, compassion, heroism, and anxiety (Dunwoody and Neuwirth 1991). However, Dutch governance network actors persisted in using the democratic forum role of media strategically, which ultimately exerted pressure on the Dutch political agenda. This did not result in major policy changes in the time period studied in this paper (2017–2018). But in 2019, the Dutch government changed its gas drilling policies, and, although we did not study 2019, it cannot be ruled out that the policy changes were influenced by the increasing, critical media reports.

Conclusions

Overall, the two cases show that news media, in line with previous theories, served different roles in the risk governance decision-making processes regarding specific earthquake risks: as democratic fora, as agenda setters, and as strategic instruments for network actor communication. In both cases, media attention around earthquake risks was largely risk-event driven as this is more newsworthy than non-event risks and focused on dramatic and direct consequences. This underscores studies that contend that media logic is biased towards sensational stories and events (Bennett 2009). According to our respondents, media logic limits the agenda-setting role of media in risk governance processes and can have adverse consequences for risk governance networks. Actors in the governance network tend to focus on techno-scientific information (and thus low newsworthiness) which seriously hinders media's roles as democratic fora and limits the reporting about the risk by news media, thus reducing the agenda setting role.

Theoretical mechanism

The two cases show that media can play different roles in social amplification or attenuation of risk. News media as democratic forum, can amplify risk as a social construct by disseminating information and diverging opinions and creating more awareness, even in absence of increasing (or new) physical risk events. With regards to the fundamental question in SARF about ‘*what is amplified?*’ our study provides two answers. First, the awareness about a risk is amplified, as more messages become available about the techno-scientific aspects of a risk, and particularly about the perceived adverse consequences. The perception of consequences may differ between individuals, stakeholders and communities. It can lead to discussions and ambiguity as Poumadère and Mays (2003) and Busby and Onggo (2013) argue, which may further shape the development of perceptions of the risk as social construct. Second, interviewees in Italy report that due to media attention the region was stigmatized, which adversely affected the region’s recovery. These secondary adverse effects can at least to some extent be attributed to media, which thus amplify the material damage.

On the basis of interviews with a wide variety of stakeholders in two risk governance networks our study suggests that decision making in earthquake risk governance networks shows resilience against short-lived media influences. In the governance of earthquake risks, media logic overrules other institutional logics only for a short while and not in the long run when media only play a role as democratic forum. This conclusion nuances existing literature arguing that media logic overrules other institutional logics (Mazzoleni and Schulz 1999; Strömbäck and Esser 2009) and adds to SARF that media play different roles in the creation of ripples which reach the political arena.

Limitation of the study and future research

A limitation of this study is that it focuses only on the governance of earthquake risks in two cases. The empirical generalizability may be limited as risk dynamics are context dependent (Wardman and Löfstedt 2018). Second, the interviews were held in 2017 and 2018, while in the Dutch case in 2019 the drilling volume was lowered dramatically with the aim of mitigating future earthquakes. Future research could investigate whether the media influenced this decision. A third limitation is that this study is only based on interviews with the most important stakeholders in risk governance networks. Media actors themselves and other parties were not interviewed. Future research including interviews with journalists, will further add to the understanding of the media-risk governance interaction, *the weakest link in research about the social amplification of risk* (Howarth 2013).

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Appendix A

	Respondent Organization Dutch Case	Respondent Organization Italian Case
1	Ministry Economic Affairs	National Reconstruction Commission
2	Ministry Economic Affairs	Marche Region Communication Center
3	Ministry Economic Affairs	Regional Reconstruction Group
4	Groningen Province	Assisi Municipality
5	Middle Groningen Municipality	Norcia Municipality
6	Middle Groningen Municipality	Local Community Preci
7	Groningen Safety Region	Local Group Hospitality Displaced Citizens
8	Groningen Safety Region	Local group <i>I Love Norcia</i>
9	National Coordinator Groningen	Local group <i>We are Norcia</i>
10	National Coordinator Groningen	Geology Camerino
11	Local Group <i>Gasberaad</i>	Association of young farmers in Marche
12	Local Group <i>Gasberaad</i>	Campi di Norcia
13	Local (Action) Group <i>Groninger Bodum beweging</i>	Sviluppumbria Umbria
14	Royal Netherlands Meteorological Institute (KNMI)	University of Perugia Cultural and Communication Processes
15	Dutch Petroleum Company (NAM)	Geology University of Perugia
16	Dutch Petroleum Company (NAM)	
17	State Supervision of Mines	
	State Supervision of Mines	