Commons knowledge and the definition of risks in policy-making processes

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Abstract

In this paper, we want to know *how knowledge, available and shared in social media networks (like Twitter, Facebook, Hyves, blogs, wickis etc,) does influence processes of risk definition in policy-making processes regarding 'wicked problems' and how this can be explained?* Little is known about how policy relevant knowledge in social media based networks is created and shared and how it influences the shaping of public policy processes. The research strategy in this paper involves a comparative case study. The following two Dutch cases could be relevant: the vaccination against uterus cancer and the vaccination against the Mexican swine flu. In both cases, the RIVM (Dutch research institute for public health) played a major role. Based on the two case studies, the most important conclusion is that knowledge, produced in social networks, had no influence on processes of risk definition in policy-making processes. Three explanations are given. First, the factor time plays an important role. In 2009, social networks were less prominent than in 2011 (Lievrouw, 2011). Second, an institutional approach can explain why policy-makers of the RIVM ignored knowledge, produced in social networks (March & Olsen, 1989). Finally, from a strategic point of view, the RIVM may have chosen not to pay attention to knowledge, produced in social networks (Lindblom, 1959).

Keywords: social networks, policy-making processes, commons knowledge, risk definition, wicked problems

1.   Introduction

The Human Papiloma Virus (HPV) is a virus that is transmitted sexually and can cause uterus cancer among women. According to the Dutch Vaccine Institute, 70% of women gets the HPV virus and hence risk uterus cancer. To counter this risk, a vaccine is developed by the RIVM (Dutch research institute for public health) for girls of twelve years old to protect them against HPV infection.

In the media soon arose debate about the vaccine. On the one hand, parents and girls claimed that the vaccine would have harmful side effects (girls could become infertile). On the other hand, in response to the statements of parents and girls, the Dutch Health Council and the national government repeatedly reported that the vaccine had no harmful side effects. However, worried parents and girls did not believe this statement from the Health Council and the national government. Apparently, the authority of this knowledge, provided by the Health Council and the national government, was problematic. Many discussions about the side effects of the vaccine were held within social networks. On YouTube, both the advantages and disadvantages of the vaccination were shown. In addition, many discussions were held on so-called 'group Hyves' (Hyves is a Dutch social networking site) and websites.

The authority of scientific knowledge was problematic on social networks and this problematic role had impact on public policy. Traditionally knowledge, information and science have played an important role in the development of public policies. In doing so they also contributed to the legitimacy of public policies, especially if these policies are directed towards the handling of wicked problems (Rittel, 1972). In many cases wicked problems deal with the question: what are acceptable risks? As a result it can be seen that academic experts and academic knowledge centers play an important role in the production of policy relevant knowledge and information, although this knowledge is being scientifically contested. However, more recently we see that citizens, while using the possibilities that social media provide in order to share information, expertise and contacts, fundamentally challenge the knowledge base that lay behind existing or proposed policy programs that deal with these risks. Moreover, citizens develop their own knowledge base as an alternative for the 'official knowledge base'. As a result policy-makers have to deal with conflicting knowledge claims that might endanger the acceptance of specific policy programs. Examples in the Netherlands are the vaccination against uterus cancer and the vaccination against the Mexican swine flu.

In this paper, we want to know *how knowledge, available and shared in social media networks (like Twitter, Facebook, Hyves, blogs, wickis etc,) does influence processes of risk definition in policy-making processes regarding 'wicked problems' and how this can be explained?* However, little is known about how policy relevant knowledge in social media based networks is created and shared and how it influences the shaping of public policy processes. First, we address the nature of policy-making processes around wicked problems (section 2). Secondly, we focus on the role of knowledge in social

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networks and how processes of risk definition develop and what its background is (section 3). Third, we argue that boundary work and boundary objects play an important role in understanding the role of knowledge in social networks (section 4). Based on these explorations we develop a research strategy (section 5), which is used to analyze two recent (Dutch) healthcare cases (section 6) while in the last section (section 7) some conclusions are drawn.

2.   Policy-making processes around wicked problems

From an institutional approach to policy-making, processes are embedded in a set of historical norms, rules and practices. These processes can be understood from the sending and / or limiting influence of (unwritten) rules. Rules are '*the routines, procedures, conventions, roles, strategies organizational forms and technologies around which political activity is constructed'* (March & Olsen, 1989: 22). Therefore, policy is seen as the result of historical rules embedded in practices (Scott, 1995). In this approach it is primarily relevant to analyze to what extent knowledge is contradicting to existing historical rules and knowledge. The credibility of knowledge decreases as more knowledge conflicts with existing rules (Van Buuren, 2006).

In addition, knowledge has also a symbolic function (Stone, 2003). Meaning that knowledge is seen as a process of sense making. Sense making arises when knowledge is defined as a product of social construction. Social construction means the process of sharing content between different actors (Stone, 2003). In this process of sharing content, sense making plays an important role. Knowledge is therefore primarily seen as an outcome of the process of sharing content between different actors.

Moreover, during these interactions between different actors, actors can use knowledge strategically. Strategic means that actors share knowledge at the right time to do justice to their own interests, positions and views (Lindblom, 1959). Lindblom says that knowledge can be used as a tool in the ongoing struggle between different actors with conflicting interests during interactions. The struggle between these actors can be seen as a power issue. This power struggle gives form and content to knowledge (Dahl, 1961).

Policy-making processes are often characterized by wicked problems (Rittel, 1972). Typical for these problems is that policy-makers do not know what relevant causes and effects are and what effective government interventions would be, while at the same time they disagree about the norms to be applied when judging possible interventions (Rittel, 1972).

Knowledge plays an important role around wicked problems (Rittel, 1972). Around this sort of problems, the presence of knowledge mainly determines in which way causes and effects can be defined and how causes and effects can be related to each other. Knowledge has three different forms according to Van Buuren (2006):
1. Knowledge as facts. Objective information and impersonal knowledge. Knowledge is perceived as an accurate and objective representation of reality. Knowledge management is focused to build and develop a solid stock of knowledge.

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2. Subjective and socially constructed knowledge. The reality is ambiguous and allows multiple interpretations. Knowledge must be confronted with the ideas and interpretive frameworks of people. Knowledge is not neutral and is ambiguous.
3. Knowledge as experience. Focuses on the action component in knowledge. Knowledge is intertwined with action. Knowledge derived from experience, takes place at two levels: individual and collective. The notion of learning is important: to (creatively) adapt to constantly changing conditions.

Knowledge is ambiguous around wicked problems. Around this kind of problems different facts (in some cases contradictory facts) are confronted with each other. So, regarding to wicked problems there are conflicts about facts; what are the 'real' facts? Moreover, from a socially constructed view of knowledge, the disagreement around wicked problems about the norms to be applied results in conflicts about knowledge based on different interpretive frameworks of people. From this perspective, knowledge is personal and institutionalized. Finally, different and also contradictory experiences of people can result in a conflicting role of knowledge. Thus knowledge is based on different experiences. These characteristics result in the assumption that regarding to wicked problems knowledge can be defined as questionable.

3.   The role of knowledge in social networks and processes of risk definition

In addition to the importance of traditional media, social networks play an increasing role in sharing and facilitating different forms of knowledge in our modern society (Bekkers, 2004). Web 2.0 is a metaphor for a collection of applications that also can be referred to as social networks. Social networks have a number of important characteristics.

The first characteristic of social networks is that users are no longer just consumers of knowledge and information, but also co-producers (Boulos & Wheeler, 2007). Co-production implies that potential users of social networks are able to organize themselves as a group, and are able to share and create new experiences. Hence the binding power of the Internet is of strategic importance for the development of social networks (Bekkers, 2004).

A second characteristic of social networks is that users are nearly always online in these networks through laptops, mobile phones or desktops. Users are constantly accessible and share experiences with each other.

Third important characteristic of social networks is that these networks are open and flexible and build on Granovetter's idea (1973) of weak ties: networks of people who barely know each other and only want to share certain content. Castells (1996: 412) argues: *the material organization of loosely coupled, time-sharing social practices that work through flows of information, images, sounds, symbols and interactions'.* Co-production and interaction assume that the content is flexible and relevant content is increasingly customized.

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In social networks users are co-producers of knowledge and information. Moreover, users are constantly accessible and therefore can add current knowledge. In addition, social networks have hardly any physical boundaries. These characteristics mean that knowledge is debatable in social networks (Lievrouw, 2011). In particular, scientific knowledge is debatable, especially since every user can add knowledge and within social networks may occur as a potential expert.

Knowledge in social networks can be referred to as 'commons knowledge', because all users within social networks can add knowledge and can exchange knowledge with other users (Lievrouw, 2011). For commons knowledge the effect of the presence of networks is important: as users within social networks share more knowledge when knowledge is more meaningful. The presence of commons knowledge in social networks affects two aspects: a) the number of users increases as b) appears that the size of knowledge production increases (Lievrouw, 2011). The danger with a very large number of users and a high level of knowledge production within social networks is that transaction costs are too high for changing knowledge (Lievrouw, 2011).

An important aspect of knowledge in social networks is that boundaries between knowledge and scientific knowledge ('theoretical knowledge') in these networks are becoming vague (Lievrouw & Livingstone, 2006). Decades earlier, in this context Bell (1973: 20) already said: *'change in the character of knowledge itself'*. Knowledge can be exchanged between different users in social networks, where each user can present himself or herself as a potential expert.

Knowledge in social networks plays an important role in influencing the processes of risk definition. First, because each individual can add relevant knowledge about risks to social networks (even contradictory knowledge to the dominant definition) and thus influences definitions of risks. Moreover, on social networks multiple interpretations of people about certain risks are confronted with each other (for example, there are (no) harmful side effects of a vaccine). In addition, people can exchange experiences (for example, experiences of harmful side effects of a vaccine) about certain risks and these experiences can be used to influence the definitions of risks. These arguments are strengthened by the binding power of the Internet.

Before the industrial revolution in the 18th century, risks were seen as threats, which originated in their fate or perhaps 'the will of God' (Beck, 1999: 50). From the 19th and 20th centuries, risks are seen as a threat and are produced by decisions of people and organizations (Beck, 1999: 50). At the same time, the continued rationalization of decision-making processes is focused on a further reduction of risks to 'acceptable' risks (Beck, 1994: 9). According to Beck, this is not conclusive, because risks cannot be reduced to acceptable risks. Beck (1999: 75-77) gives three reasons:

1. Risks are no longer manageable to a certain place and within a certain time period;
2. There is no clear relationship between cause and effect, and there are often several actors 'guilty' and responsible;
3. There are insufficient opportunities to compensate or ensure for damage.

Beck (1999) argues that in the risk society two conflicting risk definitions are available. First, a definition of risk based on scientific rationality. Second, a definition based on the social rationality of citizens (commons knowledge), stimulated by concerns. It is relevant to note that citizens use the scientific rationality to support their own social rationality.

It is not just about knowing these new risks, but also the assessment of particular events, developments or issues that may be risky (Douglas & Wildavsky, 1982). This is determined by our knowledge of the future and the degree of consensus on the desired vision. However, there is no knowledge that gives a clear picture of what the future looks like. There is fundamental uncertainty and ambiguity. So, Douglas and Wildavsky (1982: 23) call attention to the social environment where certain trends are clearly defined as risky and other developments are not considered as risky.

How does this process of risk definition develop? The assumption is that each community has a selective perspective of its natural environment. These perspectives determine whether or not risks are worth taking countermeasures (Douglas & Wildavsky, 1982: 7). This is a political consideration. A cultural analysis of risks shows why certain developments may or may not have been a risk. It is important how values, interests and daily practices of actors define processes of risk definition. This also has implications for how risks are interpreted and what measures must be taken, because risks are defined in different social environments (Douglas & Wildavsky, 1982: 9).

4.   Boundary work and boundary objects

The role of knowledge in social networks and their impact on policy-making processes can be seen as boundary work. An important finding is that clichés about the relation between knowledge and policy are highly out of date (Hoppe, 2010). These stereotypes suggest that policy-makers are concerned with policy and scientists produce knowledge. The opposite is true: policy-makers also produce knowledge and scientists design policy (Hoppe, 2010). So 'policy experts' act on two fronts: Firstly, they design policy and secondly, they produce knowledge. The boundary between these roles is unclear. Therefore, Hoppe concludes that processes of knowledge production, expert advice and policy design cannot be described in terms of clear and sharp boundaries.

From a macro perspective can be said that interactions between science and policy are encouraged by the scientific approach to society and the politicization of science (Hoppe, 2010). At the micro level it does not mean a complete blurring of boundaries between policy and science.

Because boundaries between knowledge and policy are vague, the notion of boundary work is important (Halffman, 2003; Hoppe, 2010). Boundary work means meaningful and targeted activities aimed at creating a collective product. Achieving a collective product means that policy-makers and experts have to discuss about tensions and have to break connections between their political-administrative world and academic-professional world. More formally, boundary work can be understood as the attempts of actors to define opposing practices by definition, and attempts by actors to find fruitful

cooperation between the limits of science and policy through a division of labour more or less accepted by the relevant actors (Halffman, 2003; Hoppe, 2005; 2009).

The assumed boundary between knowledge produced in social networks on individual and collective level, and otherwise the question how policy-makers in policy-making processes can deal with this knowledge, can be regarded as boundary work.

In the late '80s, the concept of boundary objects is introduced and refers to different ways how knowledge can be used in different communities. Social networks can be seen as boundary objects (Star and Griesemer, 1989).

First, social networks are capable enough to adopt individual meaning (local content) and robust enough to abstract individual meaning to a common product. This reason is also a characteristic of boundary objects. Star and Griesemer (1989: 23) said about boundary objects that they are able to adapt to local content and on the other hand, boundary objects are robust enough to create a common identity.

Second, social networks are weakly structured in common use. In this context, Star and Griesemer (1989: 23) said about boundary objects that '*they are weakly structured in common use, and become strongly structured in individual-site use. They may be abstract or concrete'.*

Finally, discussions on social networks have different meanings in different social worlds, but social networks are able to confront and integrate different meanings. This way, Star and Griesemer (1983: 23) argue that '*they have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable means of translation'.* Thus boundary objects are so structured that they have meaning to both individual and collective level.

5.   Research strategy

The research strategy in this study involves a comparative case study. The advantage of the case study method is that it recognizes the complex nature of social phenomena in a coherent and integrated way. It acknowledges the complex and meaningful interaction between relevant social processes and actors, instead of limiting the study of social phenomena to a highly specific set of variables and the relations between them (Yin, 2003).

The role of commons knowledge in social networks plays an important role in our case study in terms of assessing the nature of discussions on social networks and how policy-makers cope with them. It is important to use a research strategy that enables us to describe, analyze and reconstruct the interpretations of relevant actors and the discussions on social networks that take place. Therefore, we have combined a variety of research methods. First, we directly observed and analyzed the interactions and the content of the communication – discussions, photo's and videos – in relation to relevant social network websites (like Twitter, Facebook, Hyves, blogs, wickis etc) and other Internet sources. In order to understand how this commons knowledge is being created

and shaped in social networks, we use a network analysis program that has been designed for data mining the social web (O'Reilly, 2011). Secondly, we conducted semi-structured, in-depth interviews with three relevant stakeholders per case in order to understand how policy-makers deal with this commons knowledge. Thirdly, we analyzed the content of relevant policy documents. The content analysis of relevant social network websites, the triangulation of interviews and relevant policy documents was intended to enhance the validity of research findings (Yin, 2003).

The selection of cases depends on the conceptual framework to be developed, we think that at least the following two Dutch cases could be relevant: the vaccination against uterus cancer and the vaccination against the Mexican swine flu. The cases are selected based on 'most similar'. It consists in comparing very similar cases that only differ in the dependent variable, on the assumption that this would make it easier to find those independent variables, which explain the presence or absence of the dependent variable (Yin, 2003). In both cases, the independent variable is knowledge in social networks. The expectation is that the independent variable affects the dependent variable, namely processes of risk definition in policy-making processes.

Why 'most similar'? Both the vaccination against uterus cancer and the vaccination against the Mexican swine flu healthcare risks play an important role. In addition, both cases can be regarded as cases on the level of individual behavior. Every individual has the choice whether or not to vaccinate against these diseases. Moreover, in both cases social networks have played a major role in communicating and mobilizing people. Furthermore, many discussions on these networks were about the harmful side effects of the vaccine. Finally, both cases had impact on public opinion and policy communication.

Based on the above theoretical insights a conceptual model will be developed. The cases will be analyzed and compared by making use of the following model:
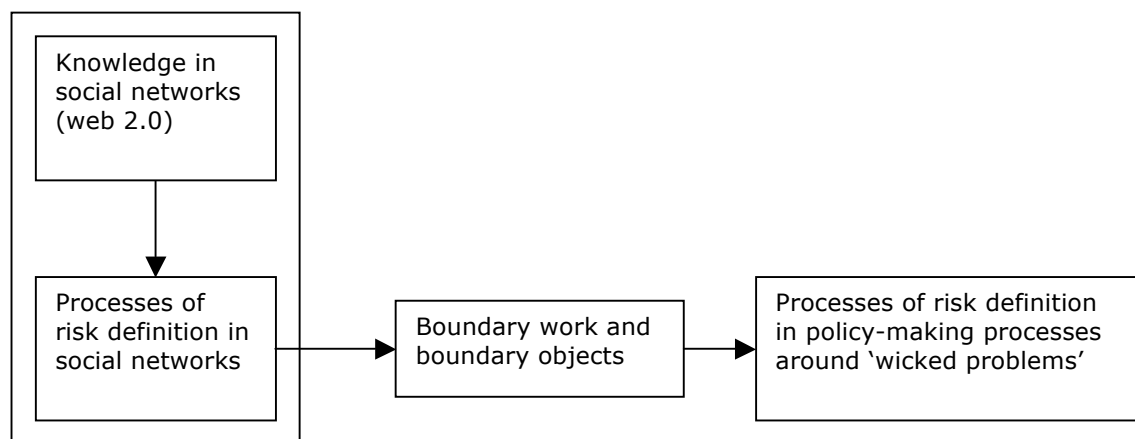

Figure 1: Conceptual model

Citizens are able to organize themselves on social networks. Citizens produce knowledge (commons knowledge) in these networks. This knowledge affects processes of risk

definition. Policy-makers are challenged to these processes of risk definition and have to affect these processes in such a way that does justice to the objectives of public policy.

To measure the above model, we redact an analytical model and 'operationalize' the most important concepts. We use the following model for description and analysis:

Research factor	Indicators
Knowledge in social networks	- Which social networks played an important role? - What were the number of users and the scope of discussions on social networks? - What kind of knowledge added users in social networks? - Was there cross-referencing between users of social networks? - What was the status of knowledge in social networks? Did users accept expert knowledge?
Processes of risk definition in social networks	- What was the dominant risk definition in social networks? - During discussions on social networks, did the dominant risk definition change? - What were the causes and consequences of risks? - How did users of social networks look at possible solutions to risks? - Which role did knowledge in social networks play in defining causes and consequences of risks?
Boundary work and boundary objects	- Were social networks capable enough to link and facilitate different individual meanings (local content)? - How did users of social networks deal with knowledge from policy-makers? - How did policy-makers deal with knowledge, produced in social networks? - How did users of social networks

	and policy-makers react to each other?
Processes of risk definition in policy-making processes	- What was the dominant risk definition of policy-makers? - What were the causes and consequences of risks? - How did policy-makers look at possible solutions to risks? - Was the dominant risk definition of policy-makers influenced by the dominant risk definition in social networks? - Did the process of risk definition clash with historical rules? If so, how did policy-makers deal with this clash? - Finally, which knowledge is included and which knowledge is not included in policy?

Table 1: Analytical model

6.   Empirical findings

In this section, we present the two case studies according to the analytical model presented in the previous section.

6.1   The vaccination against uterus cancer

Background

The Human Papiloma Virus (HPV) may play a role in the development of uterus cancer. According to the Dutch Vaccine Institute, 70% of women get the HPV virus. In 98% of the cases, it does not result in uterus cancer, but an estimated 2% of women gets uterus cancer. To counter this risk, the RIVM developed in February 2009 a vaccine for girls of twelve years old in order to prevent against uterus cancer. That the HPV vaccine was not as positive as held or assumed became clear in the media. Proponents of the vaccine argued that the vaccine was a good preventive measure for uterus cancer, but opponents said that the vaccine had harmful side effects such as partial paralysis or infertility. The objections were construed into many websites and campaigns, which informed girls and parents about the 'real' facts…

Knowledge in social networks

Social networks were used by proponents of the vaccine to inform the target group (girls of twelve years old) about the vaccination program. Because it concerns a very active

group on the Internet, the relevant actors used websites and videos to convey information about the vaccination. The study of the Web showed that YouTube was a popular medium to educate girls what the vaccination means. The videos on YouTube showed images of the vaccination itself. YouTube was used both by proponents and opponents of the vaccine. Videos that were posted by the proponents were viewed about 10.000 times. However, videos of the opponents were viewed much more:

	Video on YouTube	Target as shown on YouTube	Number of views until June 22, 2011
1	HPV Vaccination	HPV vaccination for girls of twelve years old… Not Without risk!	89.357
2	The dangers of the HPV vaccine – part 1	The government maintains that vaccines are safe and that they prevent against infectious diseases. But this is refuted by statistics and surveys.	27.196
3	The dangers of the HPV vaccine – part 2	The government maintains that vaccines are safe and that they prevent against infectious diseases. But this is refuted by statistics and surveys.	10.896

Table 2: Top three most watched videos on YouTube about uterus cancer

We can say that the videos on YouTube had mainly a mobilizing function: do not get vaccinated. In addition, the opponents of the vaccine also used Hyves. We looked in particular at so-called 'group Hyves'. The table below shows, which 'group Hyves' were most active and popular, what the objective was and how many members they counted:

	Hyves	Target as shown on Hyves	Membership until June 22, 2011
1	Vaccination against uterus cancer	Let your daughter not just blindly vaccinate and let you informed of the disadvantages of this vaccine!	2.123
2	HPV vaccination hotline	Just like stories about complaints or harmful side effects!	768
3	Against the vaccination!	Physicians are sponsored to promote the vaccine. Petition sites are fake and sponsored by manufacturers.	461

Table 3: Top three membership of so-called 'group Hyves' about uterus cancer

Based on these findings, we can conclude that YouTube and Hyves were the most important social networks. Other social networks, like Facebook or Twitter, played no role in this case. Opponents of the vaccine used social networks far more than proponents of the vaccine.

The kind of knowledge that in social networks was added, was primarily based on interpretations of possible harmful side effects (in some cases based on reports from doctors) and not based on experiences with the vaccine itself. On Hyves we found the following supporting quote on March 2, 2009: '*give your opinion about possible harmful side effects of the vaccine, preferably underpinned by medical reports'.* Interpretations

were mainly based on different meanings of users of social networks about the vaccine. Knowledge from experts about the vaccine was questioned. The following quote on Hyves on March 2, 2009, illustrates this: '*physicians are sponsored to promote the vaccine. Do not follow their advice about the vaccine!'.* Another quote shows: '*do not believe medical reports. These reports are not true!'.* Social networks provided relatively easy possibilities for different interpretations of users. The following citation argued this on 4 March 2009: '*I agree with you Margreet. You pointed rightly to the risk of infertility. I would like to refer you to the meaning of Klaas-Jan. He says that the vaccine can cause partial paralyses'.* So, there was also talk of cross-reference between users of social networks.

Processes of risk definition in social networks

The dominant risk definition of uterus cancer focused on the harmful side effects of the vaccine. Harmful means that the vaccine would provide infertility and (partial) paralysis. Looking at the types of discussions on social networks, the common denominator was the risk of the vaccine. The following citation on Hyves on 11 March 2009 shows this: '*take care! The main risk of uterus cancer is not the disease itself, but the vaccine!'.* During discussions on social networks, the dominant risk definition did not change. The following quote on March 21, 2009, highlights this: '*I think after this discussion, we can only conclude that the vaccine has adverse side effects'.* So, we can conclude that the dominant risk definition did not focus on the causes of uterus cancer, but more on possible harmful side effects of the vaccine.

Possible causes for the discussions were partly given on social networks. Firstly, it was a relatively new vaccine and untested. Therefore, on social networks quickly arose concerns about the vaccine. Secondly, on social networks the idea was that doctors wanted to make profit with the vaccine (Jan W. said on Hyves on 23 March 2009: '*physicians are sponsored to promote the vaccine*'). Finally, on social networks it was doubted by users whether the vaccine actually caused protection against uterus cancer. Videos appeared on YouTube with the following description: '*the vaccine does not protect against uterus cancer. There is no reason for you to get vaccinated'.* The relationship between the vaccine and uterus cancer was an assumption and unproven. Besides the result that the dominant risk definition focused on potentially harmful side effects of the vaccine, there were a number of other consequences. First, there was great confusion among girls and parents as to whether or not to be vaccinated. The following quotation on Hyves on March 29, 2009, shows this clearly: '*what should we do? I do not know! Get vaccinated?'.* The end result was that approximately 20% of twelve-year-old girls had not been vaccinated. Second, a consequence was that doubt was given to the neutral and expert role of the government. Users on Hyves argued on 29 March 2009: '*from a government can be expected that they had tested the vaccine! Who should we trust?'*

Possible solutions to the vaccine itself were not discussed. This is due to the fact that there were no alternatives to the vaccine. According to Jaap K. on Hyves on 24 March 2009, a solution could be the following: '*all these dangers of the vaccine. I think there is only one solution: do not get vaccinated!'.*

Knowledge played an important role in defining causes and consequences of risks. Firstly, knowledge from the government and experts tried to define cause and consequences in a positive way. The RIVM put videos on their website on April 2, 2009, with the title: '*this video shows that the vaccine is completely safe'.* Government and experts tried to make clear on social networks that there were no risks. However, this knowledge was not believed, due to aforementioned causes. Knowledge from the government and experts played a relevant role in mobilizing people on social networks. Second, this knowledge was not believed, because medical reports were linked and cited by users, which showed that the vaccine was not tested, long term effects were unclear and the vaccine could lead to infertility. An example is Bas U. on Hyves on 5 April 2009: '*this is a link of an international report. This report argues that the vaccine has unknown long term consequences and could even lead to infertility'.*

Boundary work and boundary objects

The common denominator of discussions on various social networking sites was that all discussions focused on the harmful side effects of the vaccine. On the one hand, users exchanged limited content with each other and on the other hand, users exchanged interpretations with each other. Users responded also to individual meanings on social networks. In this way, local content was linked between users and facilitated on social networks.

Users of social networks simply did not believe knowledge from policy-makers of the RIVM. In the next paragraph the role of policy-makers will be examined in more detail. We can say that users of social networks did not deal with knowledge from policy-makers. Users had their own knowledge base, and knowledge from policy-makers had no influence on this knowledge base.

In response to the dominant risk definition in social networks, policy-makers provided information about uterus cancer via a number of websites (for example, the website of the Dutch Government [www.rijksoverheid.nl]). In addition, policy-makers used traditional media to convince people of the safety of the vaccine. For example, several television broadcasts of 'Nova' and 'Netwerk' (Dutch news programs) were visited by policy-makers and they argued that the vaccine was not harmful. For example, on March 10, 2009, Marina Conijn of the RIVM was a guest at Nova and she responded to the '*nonsense about the vaccine on the Internet'*. Furthermore, also Dutch newspapers (like 'NRC' and 'Volkskrant') were used by policy-makers. In an interview, policy-makers said that all these actions were intended '*to negate knowledge of users, produced in social networks, and to convince people of the safety of the vaccine'*.

We can conclude that users of social networks did not react to (knowledge from) policy-makers. At least, users did not believe and ignored knowledge of policy-makers. However, policy-makers actually reacted to knowledge, produced in social networks. Policy-makers tried to disprove this knowledge and offered alternative knowledge on websites. Policy-makers used also traditional media (like television and newspapers) to persuade people of the necessity of the vaccine.

Processes of risk definition in policy-making processes

Policy-makers saw no risk in the vaccine against uterus cancer. In an interview with policy-makers of the RIVM was literally said: '*the vaccine was completely safe and reliable. Really, there was no risk!'.* Policy-makers of the RIVM recognized the dangers of uterus cancer and were limited concerned about the turmoil that originated on social networks. A quote: '*there was unrest on the Internet about possible harmful side effects of the vaccine. These discussions were followed by many people and can thus lead to rousing. Uterus cancer had a lot of dangers itself, but the vaccine was absolute safe'.*

It is therefore difficult to talk about causes and consequences, because there was no question of a certain risk. Policy-makers of the RIVM acknowledged that HPV might actually lead to uterus cancer, but that was precisely the reason for policy-makers of the RIVM to be vaccinated: '*people need to realize that the dangers of uterus cancer is the most important reason to get vaccinated'* (RIVM, 2009a)*.*

We can hardly talk about a solution, because there was no problem or risk according to policy-makers. Policy-makers constantly reported: '*the vaccination is the best solution to the dangers of uterus cancer'* (RIVM, 2009a).

The dominant 'risk definition' of policy-makers was not affected by the dominant risk definition in social networks. Policy-makers said in an interview: '*we were not guided by falsehoods on the Internet about the vaccine. We believed that the vaccine is harmless to human health'.* It could be argued that the dominant risk definition in social networks ('*the vaccine had harmful side effects'*) had a totally different dimension than what policy-makers suggested ('*the vaccine had no harmful side effects'*). So, there were two different perspectives on the vaccine and both prominent remained.

How did policy-makers of the RIVM deal with this clash between these two perspectives? Based on interviews, the following can be said. First, the RIVM gave additional information about cervical cancer by using the Internet (videos), newspapers, radio and television. Second, the RIVM scheduled a series of consultations with relevant stakeholders, such as representatives of interest groups of anxious mothers and doctors. Finally, the RIVM organized chat sessions '*to convince people of the safety of the vaccine. Several experts (like doctors, policy-makers, etc.) were presented in this chat session. These chat sessions were so busy that we* (the RIVM*) decided to organize not one session per week but four chat sessions a week'.*

Important last question is which knowledge was included and which knowledge was not included in policy? Centrally in policy (RIVM, 2009b) was the view that the vaccine was safe. In many policy documents of the RIVM was little reflected from knowledge, produced in social networks: '*we focus our policy not on the nonsense appeared on the Internet. We conduct independent policy! Be vaccinated against this dangerous disease!'.* What might have been included in policy documents as a result of all discussions in social networks, was that in many policy documents (RIVM, 2009b) was given attention for further research: '*we have to do further research into adverse effects of the vaccine over the long term*, *because this is unknown'.*

6.2   The vaccination against the Mexican swine flu

Background

De Mexican swine flu, official influenza A (H1N1) belongs to a new strain of H1N1 swine influenza virus and has its origins in Mexico in March 2009. In the worst case, infection with the Mexican swine flu can lead to death. The Dutch Institute for Health Care and Environment (RIVM) advised on April 25, 2009, people with high fever, within seven days after returning form Mexico, to report to the GP. Immediately people with high fever and flu-like symptoms reported to the RIVM. The RIVM decided to develop a new vaccine against the Mexican swine flu. Eventually, some 10 million people were vaccinated against the Mexican swine flu. In June 2009, the World Health Organization (WHO) warned of possible serious side effects of the vaccine. Soon the media created much debate about the safety and reliability of the vaccine, because the vaccine could lead to death. These discussions were mainly conducted on social networks.

Knowledge in social networks

Different social networks have played an important role in discussions about possible side effects of the vaccine. On YouTube, we saw mainly informative and critical videos about the vaccine. There were both supporters and opponents of the vaccination, but criticism of the vaccination is very popular. Opponents focused mostly on the process (the vaccine was hardly tested) and the role of the government. Also, international programs and documentaries were called in when spoken negatively about the flu. Below is a top three most viewed videos on YouTube:

	Video on YouTube	Target as shown on YouTube	Number of views until June 22, 2011
1	The dangers of the Mexican swine flu vaccine – part 1	The government maintains that vaccines are safe and that they prevent against infectious diseases. But this is refuted by statistics and surveys.	26.591
2	The dangers of the Mexican swine flu vaccine – part 2	The government maintains that vaccines are safe and that they prevent against infectious diseases. But this is refuted by statistics and surveys.	21.272
3	Doubts about side effects Mexican swine flu vaccine	Doctor Jannes Koetsier is critical of vaccine against swine flu. According to him, it is not clear what the consequences are of the vaccine.	17.062

Table 4: Top three most watched videos on YouTube about Mexican swine flu

We can say that the videos on YouTube focused on the dangers of vaccinations. In addition, the Dutch social networking site Hyves played a relevant role. We look once again to so-called 'group Hyves'. The overview below shows the different 'group Hyves' related to the Mexican swine flu:

	Hyves	Target as shown on Hyves	Membership until June 22, 2011
1	Support the victims of the Mexican swine flu	Show here your sympathy and condolences to the victims or relatives of the flu!	2.923
2	HPV vaccination hotline	Hyves information about the swine flu. So you can prepare at its best for the whole family	1.768
3	Against the vaccination!	This is the 'group hyve' where the flu is seen in perspective. It's just a flu with a name. We let us not frighten?	1.461

Table 5: Top three membership of so-called 'group Hyves' about the Mexican swine flu

The table shows that on Hyves small discussions were held about harmful side effects. Hyves offered more the opportunity to help and support victims, and provided information about the swine flu. In addition, Twitter also played an important role in discussions about the swine flu. The table below shows the trending topics on Twitter:

	Trending topic on Twitter	Target as shown on Twitter	Number of followers until June 22, 2011.
1	Mexican swine flu info	All information about the vaccine	6.321
2	H1N1 info	Monitoring and sharing H1N1 info	1.529
3	Influenzavirusx	Update dayly about H1N1 pandemic	391

Table 6: Top three according to the number of followers on Twitter about the Mexican swine flu

The trending topics on Twitter result in the assumption that people primarily use Twitter for additional information about the Mexican swine flu.

Discussions about the swine flu differed on social networking sites. On YouTube the harmful side effects of the vaccine were mainly discussed. The most viewed video was described on 11 June 2009 as: '*the dangers of the Mexican swine flu vaccine*'. In addition, on Hyves support was expressed for the victims: '*support the victims of the Mexican swine flu*'. Finally, Twitter was primarily used to get additional information: '*Mexican swine flu info*'. It can be said that the main discussion was about harmful side effects of the vaccine. The kind of knowledge that in social networks was added, was primarily based on interpretations of existing knowledge. On YouTube, Kevin S. said on 12 June 2009: '*what do you think of the video, Fleur? I agree with the video. The vaccine is dangerous!*'. The interpretations were based on different meanings of users of social networks about the vaccine. A very small number of people had shared their own experiences with the swine flu: '*I'm very sick from the swine flu. I'm afraid of the disease and the vaccine*'. Between users within the same social network (YouTube, Hyves or Twitter), there was cross-referencing. Paula A. said on May 12, 2009: '*Melvin, look what Jolanda said. She already replied your question*'. However, there was no cross-referencing between different social networking sites given the different types of discussions on social networks. On YouTube, Fernando S. said on 29 May 2009: '*only on YouTube I can find information about the swine*

flu. Furthermore, there is nothing on Internet'. Expert knowledge had on YouTube little authority: *'do not believe the RIVM, Chris. Their information is not true!'.* However, on Twitter expert knowledge was an important source of information given the types of discussions that were conducted: *'Find out the website of the RIVM for further information. You can find useful tips and links'.* While expert knowledge could have played a meaningful role on Hyves, this form of knowledge played hardly any role.

Processes of risk definition in social networks
The dominant risk definition focused on the harmful side effects of the vaccine. On YouTube was argued on 13 June 2009: *'be careful with the vaccine. This vaccine is dangerous. Watch this video once again!'.* However, on Hyves the dominant risk definition focused on the potential dangers and casualties of the swine flu. Mohamed A. says on 14 June 2009: *'I hope that I do not get the Mexican swine flu. There are so many casualties. That scares me…'.* Finally, on Twitter was a dominant risk definition hard to find, because users were mainly looking for additional information about the swine flu: *'has anyone more information about the swine flu?'.* So, the dominant risk definition varied by social networking sites and focused on the consequences of the vaccine or the swine flu itself.

There were given a number of causes and consequence for this dominant risk definition. A first cause focused on the fact that the disease originated in Mexico and Dutch people were not directly confronted with the swine flu. Hence, the dominant risk definition on Hyves focused on the potential dangers of the swine flu itself: *'In Mexico there are a lot of casualties of the swine flu. I don't hope that the disease spreads to the Netherlands'.* Secondly, a cause was that videos on YouTube and topics on Twitter from abroad showed that the vaccine was intended to make profit. Especially in Belgium played this discussion. Vera C. said on 18 June 2009: *'I found a Belgian newspaper, which notes that the medical world earns a lot of money on the vaccine. I don't like that!'.* In this way, it previously created resistance to the vaccine. Thirdly, this vaccine was also relatively new and untested. A tweet from Sander E. on June 23, 2009: *'possible side effects are unknown and the vaccine has not been tested'.* A final cause was that users shared reports that said that perhaps the virus was resistant to the vaccine: *'look, Merel, this report shows that the vaccine does not protect against the Mexican swine flu. Why would I be vaccinated?'.* These causes had an important consequence. There was great confusion and concerns on social networks among victims of the swine flu on the question of whether or not to vaccinate. A trending topic on Twitter in June was: *'what should I do? Vaccinate or not? Dou you know it?'.*

On social networks, possible solutions to the vaccine were not discussed, because there were no alternative vaccines available. On YouTube, a solution was carried forward, which was supported by many: *'all those discussions… I will wait a while to vaccinate'.*

On YouTube knowledge played an important role in defining causes and consequences of risks. On YouTube were linked videos together by users where doctors argued that the vaccine had harmful side effects: *'Watch this video, David! This doctor says that the vaccine is dangerous. You can even die from the vaccine!'.* On Hyves

knowledge played a clear role, because on Hyves was hardly any discussion about causes and consequences. Carola U. argued on 19 May 2009: '*the Mexican swine flu is a threat to public health. Does anyone have more information about the swine flu? Where can I find it?'.* In response to Carola U., Bryan G. says on May 19, 2009: '*look at the website of the national government and the RIVM. There you can find something'.* People particularly used websites and shared this knowledge with each other. On Twitter, followers in particular consumed knowledge: '*Here Trudy K., a link of a report that objectively addresses the causes and consequences of the Mexican swine flu. Very interesting!'.* Hence, there were hardly any discussions on Twitter about the role of knowledge.

Boundary work and boundary objects

Social networks were not capable enough to link and facilitate local content. This is primarily reflected in the fact that several discussions were held on different social networks. On YouTube was said by Wouter T. on 9 May 2009: '*If you want to know more of the Mexican swine flu, watch several videos on YouTube. There is no further information on the Internet'.* Different social networks were not capable enough to link and facilitate local content across several networks. In this context Gerdien van der V. said on Twitter on the 2nd of May, 2009: '*Why is there so little information about the Mexican swine flu? Only Twitter provides some information'.* By contrast, social networks were able to share local content within the same network. On YouTube several videos were linked together by users primarily to substantiate to their own interpretations: '*I found several videos about the swine flu. Here are the links for you! I'm curious what your opinion is on the videos'.*

Policy-makers of the RIVM reacted in particular on knowledge that demonstrated that the vaccine had adverse side effects. The RIVM put videos on YouTube in June with the caption: '*Information about the Mexican swine flu, showing that the vaccine is completely safe'.* There was hardly any response by policy-makers to discussions on Hyves and policy-makers were barely active on Twitter. Users did not believe knowledge of policy-makers on YouTube, because users linked videos where the message of the RIVM was undermined: '*this video shows the opposite of what is claimed by the RIVM'.* In response Patrick Z. said on YouTube on 20 June 2009: '*I have seen the video. I do not believe the RIVM. How is it possible that they show these videos?'.* So, based on the responses to the videos, it can be noted that these videos had more persuasiveness than messages of the government. Users of social networks (YouTube) took note of knowledge from policy-makers of the RIVM but did not believe this knowledge.

In response to the dominant risk definition on YouTube, policy-makers of the RIVM actively participated in discussions on blogs (for example, a special blog for the Mexican swine flu [www.griep.blog.nl]). Policy-makers provided also information about the swine flu via a number of websites (for example, the website of the Dutch Government [www.rijksoverheid.nl] and a website to inform people [www.mexicaansegriep.eu]). In addition, traditional media played also an important role in the reaction of policy-makers to knowledge, produced in social networks. For example, several television broadcasts of 'Nova' and 'Netwerk' (Dutch news programs) were attended by policy-makers. In the

broadcast of 'Nova' of November 6, 2009, specific attention was paid to the vaccination program. Furthermore, also Dutch newspapers (like 'NRC' and 'Volkskrant') were used by policy-makers. For example, on November 3, 2009, the NRC reported that the Ministry of Health felt that more information was needed about the vaccine against the swine flu. In an interview, policymakers argued that all these actions were intended '*to negate knowledge of users, produced on YouTube, and to convince people of the safety of the vaccine*'.

Processes of risk definition in policy-making processes

Policy-makers of the RIVM experienced the vaccine against the Mexican swine flu not as risky. In policy can be read (RIVM, 2009c): '*the vaccine is perfectly reliable. We encourage you to be vaccinated*'. Certainly, policy-makers argued in an interview that they recognized the seriousness of the dangers of the swine flu: '*the Mexican swine flu was a serious threat to our health'.* Policy-makers said also in an interview: '*the best thing people could do, was to vaccinate against the swine flu'*. Thus the concept of risk played no role in relation to the vaccine.

Therefore, it is hardly possible to talk about causes and consequences, because the vaccine was not seen as risky. In policy documents of the RIVM (2009c) was said: '*the infection with the Mexican swine flu can actually lead to death, but this is exactly the reason for people to be vaccinated*'.

We cannot talk in terms of a solution, because policy-makers saw the vaccine not as risky. Policy-makers of the RIVM constantly reported in an interview: '*the vaccination was the best solution to the danger of the Mexican swine flu*'.

The dominant risk definition in social networks did not influence the dominant 'risk definition' of policy-makers. In policy documents was said (RIVM, 2009c): '*while we take discussions on the Internet seriously (…), we wish to emphasize that the vaccine is still safe. This is still our central message in our policy'.* It could be argued that the dominant 'risk definition' of policy-makers ('*the vaccine had no harmful side effects'*) had a totally different significance than what users in social networks suggested ('*the vaccine had harmful side effects'*). So, there were two different perspectives on the vaccine. Both perspectives remained separate.

How did policy-makers of the RIVM deal with this clash between these two perspectives? Based on interviews, the following can be said. First, the RIVM provides additional information about the Mexican swine flu by using the Internet (videos), newspapers, radio and television. Second, the RIVM scheduled a series of consultations with relevant actors, such as representatives of interest groups of doctors and infected people. According to policy-makers, the aim of these meetings was: '*to remove concerns about the vaccine among people'*. Third, the RIVM hired an external organization, which was '*specialized in the field of communication via social networks'* (quote from an interview). In policy can be found that this organization suggested to the RIVM (RIVM, 2009c): '*create accounts on Hyves and Twitter in order to provide additional information about the swine flu and in the future engage in debate*'. Finally, chat sessions were

organized on these social networks. Once a week it was possible to chat with doctors, policy-makers, etc.

Important last question is which knowledge was included and which knowledge was not included in policy? Central in the policy documents of the RIVM was the point that the vaccine was safe. In policy documents (RIVM, 2009c) was argued: '*most important is that the vaccine is absolutely safe'.* In some policy documents of the RIVM (2009c) was found an interesting conclusion: '*discussions on social networks hardly played a role in the discussions about the Mexican swine flu'.* This is interesting, because in this way the importance of social networks was denied by the RIVM. Many policy documents noted: '*further research into possible side effects is desirable, because long-term effects are unclear. We wish to emphasize once again that the vaccine is safe'.* This note could not directly related to discussions on social networks. Thus knowledge, produced in social networks, was hardly included in policy of the RIVM.

7.   Conclusions

The central question of this paper is to understand *how knowledge, available and shared in social media networks (like Twitter, Facebook, Hyves, blogs, wickis etc,) does influence processes of risk definition in policy-making processes regarding 'wicked problems' and how this can be explained?* In order to answer this question four themes have to be adressed.

Knowledge in social networks

In the case of uterus cancer, YouTube and Hyves were the dominant social networks. The discussions on these networks focused on the harmful side effects of the vaccine. In the case of the Mexican swine flu, YouTube, Hyves and Twitter were the most important social networks. Discussions about the swine flu differed on social networking sites. We can conclude that the kind of knowledge that was added in social networks in these cases was primarily based on own interpretations of harmful side effects. Social networks provided relatively easy the possibility of sharing different interpretations of users. However, unlike the case of uterus cancer, in the case of the Mexican swine flu, there was no talk of cross-reference between users of social networks.

Processes of risk definition in social networks

In both cases the dominant risk definition focused on the harmful side effects of the vaccine. In the case of the Mexican swine flu should be said that on Hyves the risk definition focused on potential dangers and casualties of the swine flu. Possible causes for the common dominant risk definition were partly given on social networks. First, the vaccines were relatively new and also untested. Secondly, on social networks the idea was that doctors wanted to make profit with the vaccines. Finally, on social networks it was doubted by users whether the vaccine actually caused protection against uterus cancer and the Mexican swine flu. Important common consequence was that there was great

confusion among users as to whether or not to be vaccinated. In both cases a possible 'solution' was not to be vaccinated. Knowledge of policy-makers of the RIVM played an important role in defining causes and consequences of risks in a positive way ('*there are no harmful side effects of the vaccine*') and in mobilizing people.

Boundary work and boundary objects

Did users in social networks actually believe this knowledge? In both cases knowledge of policy-makers of the RIVM was not believed in social networks. On social networks, users had their own knowledge base and knowledge from policy-makers had no influence on this knowledge base. In respons to this alternative knowledge base, policy-makers provided additional information about the vaccine via a number of websites. Second, policy-makers participated in discussions on blogs. Third, policy-makers used traditional media (television and newspapers) to convince people of the safety of the RIVM. All these actions of policy-makers were intended to negate knowledge of users, produced in social networks.

Processes of risk definition in policy-making processes

Policy-makers acknowledged the dangers of uterus cancer and the Mexican swine flu, but saw no risk in the vaccines. According to the policy-makers of the RIVM, the best solution to the dangers of these diseases was to be vaccinated. So, we can conclude that in both cases the dominant risk definition of policy-makers was not affected by the dominant risk definition in social networks. How did policy-makers deal with this clash between these two perspectives? In both cases the RIVM gave additional information about the vaccines by using the Internet, newspapers, radio and television. Second, the RIVM scheduled a series of consultations with relevant stakeholders. Third, the RIVM organized chat sessions to convince people of the safety of the vaccine. Finally, in the case of the Mexican swine flu the RIVM hired an extern organization, which was '*specialized in the field of communication via social networks*' (RIVM, 2009c). In the end, what is communicated by the RIVM about the vaccines? In both cases central in policy communication was that the vaccines were safe. In addition, in many policy documents was given attention for further research into long-term effects of the vaccines. In the case of the Mexican swine flu was argued that discussions on social networks hardly played a role in discussions about the vaccine.

Possible explanations and further research

So, in answer to the central question of this paper, we can conclude that knowledge, produced in social networks, had no influence on processes of risk definition in policy-making processes. We have seen that knowledge in social networks has led to a totally different risk definition than the risk definition in policy-making processes. How can this be explained?

First, it is necessary to discuss the factor time. In 2009, social networks were less prominent than in 2011 (Lievrouw, 2011). Lievrouw (2011) argues that social networks are developing very rapidly and it is hard to predict what role time plays in this process.

Therefore, it is quite possible that social networks had not yet the size and strength in 2009 to had influence on processes of risk definition in policy-making processes. In order to exclude the factor time it is necessary to do further (longitudinal) research with cases that are more recent. The expectation is that knowledge, produced social networks, plays a more important role in more recent cases than policy-making processes in 2009. The question is whether this is true?

Second, an institutional approach offers an explanation. March and Olsen (1989) emphasize that governments often have to deal with processes, embedded in a set of historical norms, rules and practices. One of these historical practices is that governments have established patterns and historical grown handling standards (March & Olsen, 1989). Also, how governments deal with knowledge can be argued from this idea. Governments mainly use each other's knowledge and expertise and are more ore less a 'closed network' (Hoppe, 2010). An institutionalized research institute like the RIVM can hardly cope with relatively new and alternative sources of knowledge production such as in social networks. To counter this explanation additional research is necessary. Further research should be focused on organizations with a less institutionalized environment. The question should be whether organizations, with a less institutionalized environment, use more alternative sources of knowledge production such as in social networks?

Finally, in the theoretical orientation we have argued that governments could use knowledge strategically. Strategic means that actors share knowledge to do justice to their own interests, positions and views (Lindblom, 1959). Based on the two cases we can say that it was not in favor of the RIVM to proclaim that the vaccines had adverse side effects. From a strategic point of view, the RIVM may have consciously chosen not to pay attention to knowledge, produced in social networks. Future research should selected cases where governments have strategic interests in knowledge, produced in social networks.

To a responsive and legitimate government

Counter mobilizations of citizens against policy-making processes of governments (in this paper uterus cancer and the Mexican swine flu) are a trend in several European countries. Remarkably, citizens from the 'broad middle' of the society support these counter mobilizations. Especially in that 'broad middle' of the society it is good possible to find 'quirky and unknown citizens' with their own views and experiences (Van Gunsteren, 2008).

For the government, there are two strategies to respond to this trend. The first strategy is that a government should have to 'listen' to citizens. That means that the government takes the knowledge base of citizens, produced on social networks, more seriously. Social networks provide new opportunities for the government to create new relations with these citizens. These new opportunities could develop a more responsive government.

To listen better to citizens, especially to the 'quirky and unknown citizens', is commendable but not easily feasible, because it depends on the attitude and expectation how this listening happens (Van Gunsteren, 2008: 115). Therefore, the second strategy

cannot be missed. This strategy implies that the government operates more responsive, but also seeks to additional and more direct forms of democracy by direct communication with public officials by using social networks. In these more direct forms of democracy, citizens are more involved in the implementation of public policy. This second strategy can result in a more legitimate government.

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