



# SOCIAL MEDIA IN FOOD RISK AND BENEFIT COMMUNICATION

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**SOCIAL MEDIA IN FOOD RISK AND BENEFIT COMMUNICATION**

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## List of abbreviations

ANOVA	Analysis of Variance
BBC	British Broadcasting Corporation
CDC	Center for Disease and Control
CFI	Comparative Fit Index
CT	Content Testers
DF	Degrees of Freedom
EFSA	European Food Safety Authority
EHEC	Escherichia coli
EU	European Union
M	Mean
NGO	Non-Governmental Organisation
NNFI	Non-Normed Fit Index
RISP	Risk Information Seeking and Processing
RMSEA	Root Mean Square Error of Approximation
SD	Standard Deviation
SWOT	Strengths, Weaknesses, Opportunities, and Threats
SOR	Strategic Orientation Round
SEM	Structural Equation Modelling
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
UK	United Kingdom



## Preface

This doctoral dissertation has been performed within the framework of the FoodRisC project (2010-2013). The project was funded under the Seventh Framework Programme of the European Commission under the theme Food, Agriculture and Fisheries, and Biotechnology, grant



agreement no. 245124. The overall objective of the FoodRisC project was to characterise key configurations of food risk/benefit relationships and the consequent implications for risk communicators, make recommendations about the unique potential of new social media (e.g. social networks and blogging) and provide a systematic understanding of how consumers deal with food risk/benefit information.

The project aimed to identify the barriers to communicating to consumers across Europe and identify key socio-psychological and socio-demographic characteristics that affect food risk/benefit perceptions and processes as



well as consumer preferences for communication channels. This work resulted in an online resource centre aimed at policy makers, food authorities, food industry, NGOs and other stakeholders. This resource centre is designed to facilitate effective and coherent communication on food risks and benefits thereby promoting consumer understanding through clear messages ([www.resource.foodrisc.org](http://www.resource.foodrisc.org)).





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# Chapter 1

## Introduction, objectives and outline of the thesis

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This chapter is based on:

Rutsaert, P., Regan, Á., Pieniak, Z., McConnon, Á., Moss, A., Wall, P., & Verbeke, W. (2013). The use of social media in food risk and benefit communication. *Trends in Food Science & Technology*, 30(1), 84-91.

## **1.1 Introduction**

### ***1.1.1 Communication of food risks and benefits***

Only relatively recently, European and national agencies have been charged with a responsibility for food risk communication and researchers have begun to explore this field of communication. The attention to this area of research was caused by a plethora of food scares, which began in the late 1980's with the occurrence of food poisoning from Salmonella in eggs in the UK and has continued to the present day (Frewer, et al., 2013; McGloin, Delaney, Hudson, & Wall, 2009). More recent examples are the 2008 dioxin crisis in Ireland (Jacob, Lok, Morley, & Powell, 2011; Shan, et al., 2013), The E.coli contamination in Germany in 2011 (Gaspar et al., in press; Mellmann, et al., 2011) and the contamination of beef products with horsemeat all over Europe in 2013 (Verbeke, 2013). Also more chronic issues with a lower level of public interest (including the risks of pesticide residues (Williams & Hammitt, 2001), red meat consumption (Wyness, et al., 2011) or bacterial contaminations (Miles & Frewer, 2003)) require effective communication towards consumers. Furthermore the application of new technologies in food processing and developments such as genetic modification (Frewer, Scholderer, & Bredahl, 2003), the use of nanotechnology (Siegrist, Cousin, Kastenholz, & Wiek, 2007) or the development of functional foods and health claims (Verbeke, 2005a) raise questions among consumers and should therefore be properly communicated.

Risk communication around food is arguably a unique area in that the benefits food provides are necessary for survival (Lofstedt, 2006). There are of course a range of possible relationships that may exist between food risk and food benefit. Different positive and negative effects exist with all food; one example which has already received some research interest is that of oily fish, with its associated health risks (mercury) and benefits (omega 3) (Sioen, Bilau, et al., 2008; Sioen, De Henauw, et al., 2008). As highlighted by Przyrembel and Kleiner (2008, p. 72), "both adverse and positive effects on health can follow the consumption of the same food or food constituent". In communicating food risks it may be vital in many instances to take account of the overall configuration of both risk and benefit (Verbeke, et al., 2008).

Past communication strategies have focused primarily on food risks and developing ways in which to best deliver risk information to consumers. Less attention has been given to developing strategies of communicating both risks and benefits, or indeed, understanding how consumers may respond to situations in which both risk and benefit information are available to them (Verbeke, et al., 2005; Cope, et al., 2010). When presented with both the risks and the benefits associated with a food, the

risks and the negative information tend to have a greater influence on consumer perceptions (Verbeke and Ward, 2001). This is not an uncommon phenomenon; in the wider risk literature, prospect theory and the endowment effect offer explanations as to why people tend to care more about potential losses than potential gains (Kahneman and Tversky, 1979).

The European Food Safety Authority (EFSA) defines the ultimate goal of risk communication as: “to assist stakeholders, consumers and the general public in understanding the rationale behind a risk-based decision, so that they may arrive at a balanced judgement that reflects the factual evidence about the matter at hand in relation to their own interests and values” (EFSA, 2012, p.4). Good communication practice seeks to bridge the divides between scientific experts, policy makers, health practitioners, industry marketers, and consumers (Barnett, et al., 2011). However, it cannot be taken for granted that a target audience will pay attention to information intended for it (Verbeke, 2005b). Effective communication requires clear identification and thorough understanding of the target audience’s needs and appropriate management of the information provision so that it optimally addresses particular needs and interests.

Much research has been done to examine the determinants of risk perception and to identify the necessary components of effective food risk communication (e.g. Covello & Sandman, 2001; Rollin, Kennedy, & Wills, 2011). However, this work has not been matched with the development of appropriate, effective and efficient tools for the delivery of such communications. In particular, very little work has been done examining the implications of the explosion of social media and new web technologies in the specific context of food risk and benefit communication. The proliferation of social media applications such as online communities, social networking sites, or blogs gives the public new means for receiving, and importantly, providing information.

### **1.1.2 Introduction of social media**

In the last decennium the Internet has seen a new array of technical innovations that go collectively under the names of ‘web 2.0’. Web 2.0 provided a platform for the evolution of social media which is defined as “a group of Internet-based applications that build on the ideological and technological foundations of web 2.0, and that allow the creation and exchange of user generated content.” (Kaplan & Haenlein, 2010, p. 61). Where web 1.0 allowed consumers to read and search information, web 2.0 allows consumers to generate information themselves. The term social media, also referred to as user-generated media (Giustini, 2006), covers a wide array of different communication outlets including social networking, video- and picture-sharing, blogs, and microblogs (Tinker & Fouse, 2009) (Table 1.1).

Table 1.1: Description and indication of resources required on selected social media tools (ranked from primarily dissemination to increasing levels of engagement)

	Tool	Description	Time and staff effort	Cost
Dissemination ----- ↓	RSS feeds	Real Simple Syndication: a file that contains frequently updated information such as news headlines or blog posts; can be subscribed to using field readers or aggregators	Low	Low
	Image, podcast and video sharing	Sharing of pictures, video or web-based audio or video content on user-generated sites that allow storage, retrieval and commenting on the uploaded content	Low	Low
	Microblogs	Form of blogging that allows users to write brief text updates (usually up to 140 characters) and to publish this information so that a network of followers can view and comment on the information	Medium	Low
Engagement	Blogs	Information (text and/or visual) posted on a regularly updated website and displayed in reverse chronological order	Medium	Medium
	Social networks	Online communities that allow users to connect, interact and exchange information with those who share interests and/or activities	High	Low

Source: Rutsaert, Pieniak, et al. (2013); Based on: Tinker and Fouse (2009) and CDC (2010).

The attention to social media is growing exponentially. Social media applications like Facebook, Twitter and YouTube are extremely popular and used by millions of people every day. However, the growth in popularity is only one aspect of social media. The increase in the amount of time people are spending on these applications is changing the way people spend their time online as well as off-line, and has major consequences for how people behave, share and interact within their normal daily lives (Nielsen, 2009), where food-related decision-making, purchasing, preparation and consumption traditionally occupy an important place.

News generation and information sharing is changing too. Social media opens the era of citizen and collaborative journalism where professional journalists can both create news collaboratively and interactively with members of the public but also use the public as 'feet-on-the-streets' eye witness reporters (Tilley & Cokley, 2008). In addition, social media is becoming a primary delivery platform for news. With the emergence of smart phones breaking news can now be delivered directly to a

person, regardless of time or location, with the additional power that the social network of interconnected people acts as a communication network (The Independent, 2011).

### **1.1.3 From consumption to prosumption**

With the introduction of web 2.0, consumers occupy a central position as communicators and sources of information. These technological developments have led to a revival of 'prosumption'; a development in the consumption-production relation in which consumers take over the work of producers, more specifically, producers of information in this case. A concrete example that describes how prosumption works is discussed by Ritzer's work "*The McDonaldization of Society*" (Ritzer, 1983). In the fast food industry, consumers are expected to take over the work of the employees. Diners stand in line to order their food, carry it to the table, prepare their own side dishes, fill their own drinks and dispose their own debris after the meal is finished. As less employees are needed, this evolution benefits the producer as consumers take over work for no pay at all. In addition, customers also gain from this arrangement in the form of a reduction of the time to receive their food, an increased level of control over the process and freedom over their decisions.

The current digital environment also enables an active consumer role. Prosumption was not invented with the introduction of web 2.0, but both are strongly linked to each other as these newly developed applications form the basis for a renewed form of prosumption and consumer-generated content (Ritzer & Jurgenson, 2010). For example, on Wikipedia, users generate, update and edit articles (Giles, 2005), on YouTube users upload personal videos (Cheng, Dale & Liu, 2008) and Twitter is used to share information and opinions with followers (Jansen, Zhang, Sobel, & Chowdury, 2009). Companies and individuals are increasingly utilizing the end-users to generate ideas and to develop products and services for them. Also here, there is a benefit for prosumers in that they seem to enjoy, even love what they are doing and are willing to devote long hours to it for no pay (Ritzer & Jurgenson, 2010).

This evolution and the introduction of a consumer-dominated online channel entails important consequences for communication in general. Social media makes it possible for consumers to group themselves in communities around a collective purpose and contribute to the production or dissemination of information (Cova & Pace, 2006). This idea of 'crowdsourcing' (Agerfalk & Fitzgerald, 2008; Howe, 2006) requires additional trust in the community and this forms a delicate point for authorities as it entails loss of control. Nathan Huebner, emergency risk communication specialist and lead of Center for Disease and Control's (CDC) emergency websites, stated that social media is more than just a way to reach the public. "It's about the public talking to us. It's also about

the public talking to the public” (Tinker & Fouse, 2009). Word-of-mouth communication has traditionally been defined as “oral, person-to-person communication between a receiver and a communicator whom the receiver perceives as non-commercial, regarding a brand, product or service” (Arndt, 1967). But the nature of word-of-mouth communication drastically changed by the introduction of the Internet. The word-of-mouth phenomenon has become a much more influential and far-reaching word-of-mouth phenomenon, as highlighted in the quote: “Instead of telling a few friends, consumers now have the ability to tell hundreds or thousands of other people with a few keystrokes” (Mangold & Faulds, 2009, p. 359).

New communication tools have become gradually integrated in – mostly commercial – food-related communications. A landmark was PepsiCo’s decision to skip its annual Superbowl commercial in 2009, and instead invest \$20 million in a social media campaign called “The Pepsi Refresh Project”. The project encouraged consumers to come up with ideas to “refresh the world” which they could submit via social media applications (Mashable, 2009). This is just one example of how marketers of international food companies are embracing the power of social media. Viral marketing (also referred to as word-of-mouth marketing) has offered food marketers the potential to send a message to a wide array of consumers with less effort and at lower cost than traditional media campaigns (Kaplan & Haenlein, 2010). This phenomenon entails the development of an online marketing message that stimulates customers to forward this message to members of their social network. This can be in the form of promotions, competitions or a social media version of a ‘brand fan club’.

The extent to which this particular form of marketing would be implemented in the general field of marketing could not have been envisioned when it was first introduced (Rayport, 1996). In the contemporary world of social media, however, viral marketing is at the core of many (mostly large and international) food marketing campaigns. Cadbury, the British chocolate company, is a prime example of a food company effectively using viral marketing to promote their products to consumers. Cadbury has produced a number of advertisements under their well-known banner of “Glass and a Half Full Productions”, which are aired on television but also receive widespread attention on video-sharing sites on the Internet (Sheehan, 2010). The infamous “Cadbury Gorilla” clip and the “Cadbury Eyebrows” clip had already received well over seven million hits and ten million hits, respectively on YouTube by October 2013 (YouTube, 2007, 2009). These short clips are watched by consumers who enjoy the entertainment aspect of the video and send it to fellow consumers via social media applications like Facebook and Twitter, portraying the essence of viral marketing. By involving social media users (i.e. the consumers themselves), a message can be spread effortlessly

and rapidly throughout the social media community. However, it is fair to say that the challenge in marketing terms as always is turning a viral campaign from 'eyeballs' to purchase.

Whilst the ethical nature of some viral marketing campaigns has been questioned, particularly when the target audience is children and the food in question is associated with possible negative health outcomes (Moore & Rideout, 2007), this marketing technique does highlight an essential component of effective communication strategies: recipients of a message can also become the transmitters of that message and thus, become actively involved in the communication process. In some ways this can be seen as the 'fan club' concept in the Internet connected age. This type of marketing is one of the fastest growing alternative media segments, again with substantial current and potential applications in the food domain. Companies whose advertisements are banned on traditional media, e.g. because they may harm public health, are heavily investing in these techniques because of a lack of online regulations (Freeman & Chapman, 2008). In a similar vein, the communication of nutrition and health benefits through viral means might be seen as an alternative route of communication in cases where formal nutrition and health claims are rejected, for example following screening by the European Food Safety Authority in the European Union (EU) (Verbeke, 2011). These evolutions obviously call for appropriate legislation covering the spread of information through social media.

#### **1.1.4 Social media and crisis communication**

Communication in times of a crisis has been a key focus of risk communication research, with many policy-makers and researchers offering a number of guidelines to abide to when developing crisis communication strategies (Covello, 2003; Seeger, 2006). One such principle is timely communication with the public in order to establish trust and credibility in the information source (Jacob, et al., 2011). Social media offers a number of features which may have enabled more rapid detection of the food source in this crisis. Social media is timely and capable of reaching the group most affected by food safety quickly and easily.

There are a number of cases where social media has been successfully used in the detection of a foodborne pathogen and disease outbreak. In 2007 a web forum successfully aided the detection of a large campylobacteriosis outbreak in Canada and provided contextual insights for hypothesis generation and questionnaire development (Chester, et al., 2011). In that outbreak, forum postings regarding racers who had fallen ill shortly after a mountain bike race prompted the organiser to contact the local health unit. Based on those potential exposures mentioned on the online forum, an online questionnaire was developed and launched within 48 hours. Similarly, in 2010, the Illinois public health department received a report of an outbreak of gastrointestinal illness among guests at



a wedding reception. A standard foodborne outbreak questionnaire was converted to a digital format and the link was distributed via Facebook and emails. The Facebook survey was completed significantly faster than the email version, and thus enabled health officials to identify the implicated foods already the day after the questionnaire was distributed (Howland & Conover, 2011). Taken together, these examples highlight the potential advantage of incorporating social media into a public health surveillance system and early investigation system by reducing detection time (Newkirk, Bender, & Hedberg, 2012).

While social media clearly has a positive application potential in times of a food crisis, there is also another more negative aspect to consider. Social media may itself escalate a food crisis situation and create potentially unwarranted panic and hysteria. The social amplification of risk framework has been proposed for explaining why certain risks are amplified or attenuated (Kasperson, et al., 1988; Renn, 1991). This framework proposes that “events pertaining to hazards interact with psychological, social, institutional, and cultural processes in ways that can heighten or attenuate public perceptions of risk and shape risk behaviour” (Renn, 1991, p. 287). The traditional media has received attention in the social amplification literature as an important source of information which may act as a potential ‘amplification station’ by increasing the volume of information, and thus the salience of the issue or event in question (Petts, Horlick-Jones, & Murdock, 2001). Given its pervasive nature in the public domain, it is likely that social media plays an increasingly important role in the social and cultural processes involved in potentially amplifying public risk perception. For example, channels like YouTube make it very easy to post home-made videos online, which may offer a heightened audio-visual impact of news and can make a crisis more dramatic and alive (Mei, Bansal, & Pang, 2010). Visual elements play indeed a substantial role as media triggers in the development of a risk into a crisis (Verbeke, Frewer, Scholderer, & De Brabander, 2007). Thus, social media has the potential to contribute to the development of a seemingly small scale risk into a full-blown food crisis.

### **1.1.5 Drawbacks of social media**

Although an exceptional resource, social media can be a minefield of information which is incorrect or misleading, whether inadvertently misconstrued or intentionally altered as a result of vested interests (Lindsay, 2011; Scanzfeld, Scanzfeld, & Larson, 2010). In public health communication, many problems arise related to the spread of misinformation on social media applications, for example vaccination uptake can be negatively impacted by groundless anti-vaccination messages which have gone viral (Fernandez-Luque, Karlsen, & Melton, 2012). The volume of user-generated content that is uploaded on popular social media applications makes it practically impossible for operators to

control all the information. Unlike traditional media which operates under a more rigid publishing process of regulated journalism, stricter editorial guidelines, and media watchdogs, few checks are in place for those acting in the capacity of citizen-journalist. However, it is worth noting that in some cases social media communities consist of subject matter experts and that such specialist sites can and do distribute factual, accurate, and valuable information. Additionally, most countries try to regulate the content on the Internet to some extent. Regulation can be justified for the protection of children from sexually explicit or violent content, protecting national security and political interests, safeguarding copyright and intellectual property, and improving computer security such as anti-spam and virus spreading laws (Freeman, 2012). With respect to food, (self-)regulation commitments to limit the exposure of children – not only through traditional, but also social media – to advertising of products that fail to meet specific nutrition criteria might be a valuable avenue to consider.

An active involvement with social media requires considerable resources and effort to feed, correct or control. Not only in response to inaccurate information, but also in terms of ensuring a proactive social media presence, constant monitoring and active dissemination of information and engagement with the social media community is required, which is likely to introduce considerable, long-term expense to stakeholders. The CDC (2010) offers some key guidelines for the successful use of social media in communication strategies, including identifying target audiences, establishing clear objectives and knowing how much can be invested, all of which have relevance to the food communication domain. The CDC report highlighted the importance of knowing your resources and capacity, whilst also identifying the social media tools available and appropriate for your strategy. Table 1.1 gives an overview of popular social media tools, showing the continuum from dissemination to engagement, as well as a qualitative indication of the resources generally needed to implement food risk and benefit communication activities using these tools. RSS feeds can be used to establish an online monitoring alert system and give insight on the discussions around controversial topics like cloning or nanotechnology (Ackland, Gibson, Lusoli, & Ward, 2010). Microblogs, with Twitter as the most important example to date, can be utilized for the same purpose but also offer the opportunity for interactivity with the audience. Being present on these platforms as a credible source of information can increase visibility, not only to customers, consumers or the general public, but also to key opinion formers like popular bloggers and journalists (Lariscy, Avery, Sweetser, & Howes, 2009).

## 1.2 Scope of the doctoral thesis

The rise of web 2.0 has created a shift in flow and amount of content and therefore demands a renewed vision on best practices in communication (Brossard & Scheufele, 2013). The scope of this doctoral thesis focuses on how social media can contribute to the communication of food-related risks and benefits. This challenge is approached from a multidisciplinary perspective, incorporating theories and methodologies from risk communication as well as marketing and public participation theory. During the time period of this dissertation, research on social media has evolved at an incredible pace. To exemplify, Kaplan and Haenlein (2010) presented the most commonly used definition of social media. Four years later, in October 2013, this definition (and related research) has been cited over 200 times in publications according to ISI Thomson's Web of Science, and over 2000 times in general according to Google Scholar. Nevertheless, studies carried out in the domain of food risk and benefit communication have been minimal (Frewer, et al., 2013).

As the communication of food risk and benefits is a delicate matter, there is a need for evidence-based guidelines specifically in this field. The reaction of consumers towards information on food risks has often been described as excessive or irrational by expert communities (Hansen, Holm, Frewer, Robinson, & Sandoe, 2003; Houghton, et al., 2008). Little relation is seen between the perceived hazard of a food safety issue and its actual, scientifically proven, risk. Food- and lifestyle-related heart and coronary diseases, obesity from poor dietary habits and lack of physical activity, as well as lung cancer from smoking, for instance, are relatively large risks, which, however, are largely underestimated by consumers. Simultaneously, food-borne illnesses caused by contaminants and residues that were recently subject to intensive mass media coverage are examples of the overestimation of relatively small actual risk (Verbeke, et al., 2007).

The prevailing literature on food risk communication also attenuates the importance of trust in information as an important determinant of public response to information (de Almeida et al., 1997; Frewer, Howard, Hedderley, & Shepherd, 1996; Kjaernes, 2005; Lofstedt, 2006, 2013; Pieniak, Verbeke, Scholderer, Brunsø, & Olsen, 2007; Siegrist & Cvetkovich, 2000). Social media applications make it easy for everyone to put information on the Internet but the nature of the Internet is such that the anonymity of the sender's location, interests, role and identity often lead to concern over the credibility of the information (Mehrabi, Hassan, & Ali, 2009). Where non-expert non-official information sources dominate a communication forum, there is an increased likelihood for inaccurate information to be spread. Credibility of online information remains therefore a major communication challenge. Given that social media affords all individuals the opportunity to become a

source or channel and develop or disseminate information relating to food risks and benefits, it is necessary to reflect on the concepts of online trust and credibility.

There is no shortage of evidence of the use of social media by the food industry or product promotion, although use by public bodies, such as food safety and public health agencies is said to be in the “early adoption phase” (Thackeray, Neiger, Smith, & Van Wagenen, 2012). The reserved attitude towards social media witnessed amongst official bodies in the area of food risk/benefit communication may result both from a lack of empirical data on the usefulness of social media in food risk and benefit communication as well as a lack of evidence-based guidelines advising officials on how to most effectively incorporate social media. Many authorities and official bodies may be willing to have a presence on social media but may be unsure of how to effectively engage with it. Authorities’ perceptions of social media as a communication tool may be coloured by incidents such as the McDonalds ‘Twitter Fail’. McDonalds developed a Twitter campaign that attempted to get the public talking about their favourite memories of the fast-food chain but this backfired when Twitter users ‘hijacked’ the hashtag to tell horror stories of food safety and production and poor service (Bradshaw, 2012). Incidents such as this may leave public officials cautious about engaging with social media at an official level. Their wariness is amplified by the absence of sufficient and evidence-based guidelines to advise them on the ‘do’s’ and ‘dont’s’ of official communication on social media.

### **1.3 Conceptual framework**

The dominant understandings of communication are aligned around the traditional framework of information transfer involving sources, channels and receivers (Shannon, 1948, 2001). Though being criticised as being mechanistic, this model continues to provide a useful springboard for depicting and analysing the risk communication process (Barnett et al., 2011; Renn, 2008; Verbeke, 2008). Therefore, this theoretical model will form the benchmark of this doctoral thesis. A message is traditionally communicated by a source (e.g. scientific community, agencies, interest groups, media) and sent through a channel or medium (e.g. mass media, interest groups, opinion leaders, Internet) to a potential receiver or audience (e.g. general public, target audience, exposed individuals).

The communication process has been traditionally seen as a one-way process where information is transferred from source to receiver, which is also the case in our benchmark framework. However, this has been changed through the introduction of social media. The shift from a content-centric to the new user-centric information environment implies there is no longer an explicit direction of information flow (Hoffman & Novak, 2009). Instead of the traditional one-way flow of information (from sender or source to receiver or target audience), receivers are now able to interact through

social media with the source, the medium and most importantly with each other (Winer, 2009). As a consequence, traditional sources of information lose control over the content and distribution of the message resulting in a more complex communication process which is no longer easy to partition into dissemination or utilization. A unique feature is that a message on social media is spread by users or consumers themselves while direct contact with the information supplier is minimal (Helm, 2008). Snuderl (2008) mentioned that this is one of the reasons why web 2.0 applications became such a success; it is the users and not the producers who control the way through which information is found and used. This evolution has been incorporated in the presented framework. The level of public engagement has been put as the central driver of information flow through social media. The framework is presented in Figure 1.1 and the flow of information is indicated by the direction of the arrows.

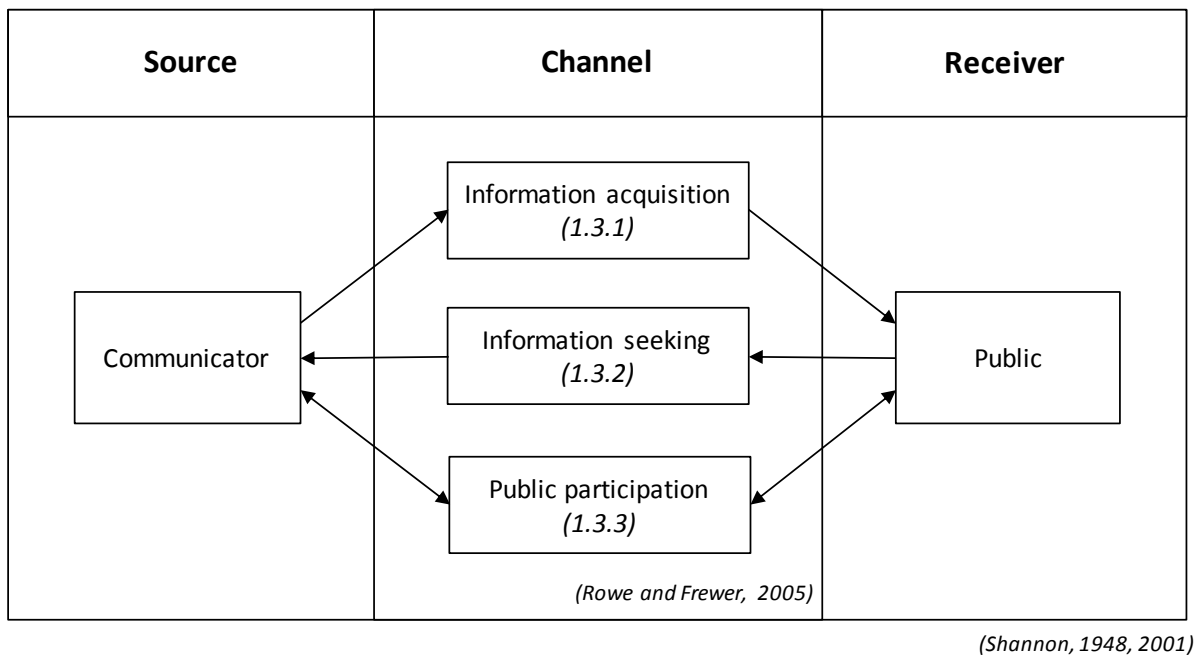


Figure 1.1: Conceptual framework

The public or receivers are actively involved in the communication process. A distinction can be made between three different types of public engagement: information acquisition, information seeking and public participation (Rowe & Frewer, 2005). Information acquisition refers to the traditional process where information is conveyed from the communicator to the public (Erdelez, 1999; Savolainen, 1995). The information flow is one-way and this level of engagement requires the least effort from the public to obtain information provided by the source. Information seeking or consulting is a second form of public engagement. Just like information acquisition, this is a non-dialogical one-way communication form but in the opposite direction. When people perceive a real

need for information, they will actively seek and use a particular information channel to obtain the information they are interested in (Griffin, Dunwoody, & Neuwirth, 1999; Kuttschreuter, 2006). Information seeking requires a higher level of public engagement than information acquisition. The third level of public engagement is public participation (Rowe & Frewer, 2000, 2005). This level is characterized by a two-way information exchange and the occurrence of deliberation i.e. a dialogue between the receiver and communicator.

In the following subsections, the different theories and concepts included, as well as the impact and innovations of social media, will be discussed more thoroughly. In this dissertation, the receiver is considered to be an individual person in a food consumption context. Therefore we will refer to the receiver as a consumer.

### **1.3.1 Information acquisition**

Research on communication has focused primarily on consumer information acquisition that is active and problem orientated (Erdelez, 1999). For consumers who are not inclined to seek information themselves, incidental information acquisition can play a prominent role. Incidental information acquisition is based on the theory of Wilson (1977) that although people might not be looking for it, they discover information through monitoring their environment. The theory of *serendipitous information*, or information that is discovered by accident, has been extensively described in library and information science (Erdelez, 1997, 1999, 2004; Foster & Ford, 2003; Heinström, 2007; Savolainen, 1995; Williamson, 1998). In the area of food communication, these theories have been not researched to our knowledge.

Discoveries can occur during daily activities like reading a newspaper, watching television or simply walking around. Unexpected information can also be encountered through purposeful searching about another topic (Heinström, 2007). However, encountering information is only the first step in the process. Whether a person actually decides to use the encountered information depends on the context (Erdelez, 2004). According to Erdelez (1997) there are individual differences in the capacity to notice information in that some people systematically show a stronger information-gathering orientation or an inclination to encounter information. People constantly consciously and unconsciously select which messages to attend to, process, and ultimately store. Motivation can be seen as the basic fuel for this process. High motivation, positive emotionality, and an open curious personality enhance receptivity to incidental information acquisition (Heinström, 2007).

The traditional model of everyday life information seeking presented by Williamson (1998) included intimate personal networks (family and friends), wider personal networks (clubs, churches, and voluntary organizations), and the mass media (newspapers, television, radio, and magazines) as sources for incidental information acquisition. The growing importance of social media in everyday life has given the research on incidental information acquisition a renewed boost (Lampe, Vitak, Gray, & Ellison, 2012; Rubin, Burkell, & Quan-Haase, 2010; Skågeby, 2012; Williamson, Qayyum, Hider, & Liu, 2012). Social networking services such as Facebook and Twitter have the ability to deliver information before one requests it and are taking up an important role as social network. The nature of many social media sites is such that friends, family, and peers can dominate one's social network, thereby giving the information provided by these individuals increased exposure relative to official authorities who may not be included in one's online social network. In addition, the public tends to rely on food-related information from not only official sources, but also from their friends, peers, and family (Palen, Vieweg, Liu, & Hughes, 2009; Pieniak, et al., 2007). The public also tends to have more trust in sources or people perceived as similar to them, for example fellow consumers. Therefore, social media can take up an important role as incidental information channel for food-related risk and benefit information.

### **1.3.2 Information seeking**

The need for additional information has been thoroughly explored within the Risk Information Seeking and Processing (RISP) model of Griffin, et al. (1999). Many aspects of the RISP framework including differences between systematic and heuristic processing (Johnson, 2005; Kahlor, 2007; Kahlor, Dunwoody, Griffin, Neuwirth, & Giese, 2003), the importance of information sufficiency (Griffin, Neuwirth, Dunwoody, & Giese, 2004; Kuttschreuter, 2006; Ter Huurne & Gutteling, 2008) and the influence of self-efficacy or affective response (Slovic, Finucane, Peters, & MacGregor, 2004; Ter Huurne & Gutteling, 2009; Yang & Kahlor, 2013) have been thoroughly explored in previous research. Channel beliefs and the way they guide the choice of particular channels to find information, however, has not been a focus of past research activities (Clarke & McComas, 2012). According to RISP model, the choice of the actual information channel depends on the consumer's beliefs about the channels, including the trustworthiness of the presented information and, in particular, its perceived usefulness. The perceived usefulness of the information provided by a channel is related to the information seeker's needs, his/her expectations, and the accessibility of the channel (Mayer et al., 2007).

When seeking information about food safety, the public has the opportunity to consult many different information channels. The media complementary framework, introduced by Dutta-Bergman (2004), suggests that interested consumers will employ various media in a complementary fashion. Two types of consumer information search processes are distinguished – internal search and external search (Bettman, 1979). Internal search occurs when individuals use information already stored in their memory based on past experiences (Bettman & Park, 1980), whereas external search involves seeking information from the environment. The last decades, the external communication landscape has undergone some major changes which deserve to be addressed.

The literature on channel use in relation to food information points to three main channels of communication: personal contacts, mass media and channels serving advertising and promotional purposes dominated by food producers and retailers. The study by Kiel and Layton (1981), for example, suggested dividing the channels into retailer-dominated channels, mass media channels and interpersonal contacts. Research by Capps (1992) confirmed this finding that the channels consumers used most for nutrition and health information were other people such as health professionals, dieticians and home economists, the mass media such as radio, television, newspaper, and labels on food packages. Mattila and Wirtz (2002), in a study on credence-based services, similarly distinguished three main information channels: personal independent contacts, impersonal independent channels such as the mass media, and impersonal advocate channels such as commercials.

Besides these traditional options, the Internet has become a key channel for consumers to seek food risk/benefit information (Jacob, Mathiasen, & Powell, 2010; Redmond & Griffith, 2006; Tian & Robinson, 2008). The main starting point for accessing the vast amount of online information nowadays are search engines (Brossard & Scheufele, 2013; Kobayashi & Takeda, 2000). By entering a specific set of search queries in the search engine, users try to find relevant information about various topics, including food safety issues. Importantly, the results appearing on the first page of general search engines are most likely to be accessed by information seekers (Eysenbach & Köhler, 2002; Laurent & Vickers, 2009). The ranking of websites depends on popularity, metadata, page titles and textual content (Greenberg, D'Andrea, & Lorence, 2004). As a consequence, information provided by official bodies has to compete with commercial or contested information which might be favoured by search engines' algorithms.

The high current societal popularity of social media creates new opportunities for consumers to seek food safety information online (Barnett, et al., 2011; Brossard & Scheufele, 2013). Social networking



sites as Facebook or micro-blogs as Twitter have built-in search engines where consumers can seek information within their online community. A different mechanism for information retrieval is social bookmarking (Morrison, 2008). Social bookmarking or 'tagging' is a practice associated with social media sites that allows individual pieces of information to be easily categorised and retrieved. A 'tag' is metadata; a non-hierarchical keyword assigned to a piece of information. This tag helps to situate an individual piece of information within a broader conversation and allows this piece of information to be easily found by browsers searching for information on the topic of interest (i.e. the 'tag'). For example on Twitter, hash tags are used to associate the content of a tweet to a particular topic; in the E.coli 104 crisis of 2011, those Tweets labelled with '#EO104' would have been easily retrieved by searching on Twitter for information on the outbreak. Tags can assist in ensuring that information disseminated via social media applications does not get lost in the mass of information available online. Collaborative tagging has led to a huge amount of user-generated metadata, however questions are raised about the vulnerability to spam and the lack of reliability. This is a reason why search engines like Google might take tagging less seriously and ignore tags for indexing websites (Xiang & Fesenmaier, 2005).

The internet and the evolution of the web 2.0 technology has made dissemination and production of information faster and easier than ever before. Social media offers communicators new channels for improving the communication of food-related risks and benefits. Whether consumers consider social media alongside the classical media channels as a channel of information should be further investigated.

### **1.3.3 Public participation**

Over the last decade, the communication of food-related risks and benefits has undergone a significant change as a growing interest has emerged to involve the public in the decision-making processes related to public policy (Dijkstra & Gutteling, 2012; Macnaghten, Kearnes, & Wynne, 2005). Rowe and Frewer (2000) point out that reasons for this are both ideological (i.e. ensuring transparency and democracy in the decision-making process) as well as instrumental (i.e. increasing support for potentially unpopular decisions). Mechanisms for engaging the public can range from simple public opinion surveys or focus groups to more complex approaches that involve more participative and deliberative processes such as citizen juries or conferences.

There is little consensus in the existing literature around the concept of deliberation. The idea of deliberation has its origins in political theory and public participation, which focus almost exclusively on collective activities (Abelson et al., 2003). In the context of public engagement, deliberation is

generally considered to occur in group contexts and to involve dialogue and discussion as a means to developing a solution. The hallmarks of deliberation include the expression of reasoned opinion, disagreement and engagement (Stromer-Galley, 2007). While deliberation has been seen predominantly as a face-to-face method, the development of new communication technologies has opened new avenues of deliberative possibilities (Boczkowski & Mitchelstein, 2012; Min, 2007; Xenos, 2008). The majority of literature discussing new online methods takes a comparative approach, pitting 'new' online versions of methods against their offline counterparts. O'Connor and colleagues, for instance, make it their explicit aim "to recreate the traditional, face-to-face interview experience" (O'Connor, Madge, Shaw, & Wellens, 2008). Much of the discussion focuses on how to transfer existing offline methodological techniques to online situations for a variety of purposes including maximisation of geographical spread or cost-effectiveness (Rowe, Poortinga, & Pidgeon, 2006). This however is arguably a rather simplistic approach to developing and validating new online technologies. Other possibilities afforded to social science research by new computational/online technologies might use the Internet to develop research designs that could not be achieved with offline methods.

As to how one might operationalize deliberation in empirical research, it has been noted (Davies, 2009) that the identifying features of deliberative activities are that they are thoughtful, careful and lengthy considerations for individuals and consist of formal discussions and debates in groups. However, there is no reason to assume that deliberation is a uniquely or exclusively collaborative activity, e.g. people may be able to deliberate on a topic without someone joining them in collaborative discussion. Indeed, it is recognised that asynchronous deliberation and remote decision-making are unproblematic online possibilities which allow individual, solitary deliberation.

An interesting point of view can be found in the work of Coulter and Parsons (1990) on the concept of 'seeing'. According to these authors, seeing is not an activity, but an achievement realised by other constituting activities that *are* visible and available to social science, i.e. looking for, inspecting, glancing at, browsing through, and so on. All of these activities are different ways in which seeing might be realised (for example: "I was looking for it, and then I saw it"). Thus, one might conceptualize deliberation not as an activity in itself, but rather as being visible through the manifestation of other activities. Taking this perspective, work can be done to ascertain what exactly might be the activities that might represent deliberation and within which contexts deliberation might be realised. More clarity is needed with regards to defining both deliberation and deliberative activities in terms of how deliberation could be measured, which factors influence deliberation, and the consequences of deliberation (Ramsey & Wilson, 2009).

The new generation of websites that allow users to generate content and interact are increasingly recognised as an opportunity to involve and empower consumers in the food risk and benefit communication process (Brossard & Scheufele, 2013; Rutsaert, Regan, et al., 2013). Thus far, there are a few organisations using the Internet as a vehicle for communication and information transmission in food safety or risk communication, but there is a lot of potential in doing it that remains unexplored (Thackeray, et al., 2012). Besides its advantages in the ease and ability to reach out to wide audiences, the use of an online environment offers some new potential for deliberation as in theory it might allow researchers to better understand which aspects people pay most attention to and to know what their immediate reactions are. A major challenge lies in measuring and monitoring the online deliberation process.

#### **1.4 Research objectives and research questions**

The primary aim of this doctoral dissertation is to offer evidence-based recommendations relating to the use of social media, a platform that may prove both useful and essential as a part of future risk and benefit communication strategies. The unique role that social media can play in providing effective and efficient information about food will be evaluated to provide evidence-based guidance to risk communicators on how best to employ these media when communicating about food risks and benefits. Based on the conceptual framework, four main research objectives are distinguished, leading to ten research questions.

##### ***1.4.1 Research objective 1: Explore the communicators' perspectives on the use of social media for food risk and benefit communication***

This dissertation will endeavour to meet its overall aim by exploring insights from both sources as well as receivers of food information. The first objective aims at exploring the perspectives of both experts and stakeholders charged with an official merit for food communication towards the use of social media. The goal is to gain a broad view of the ideas about the usefulness of social media. Therefore different types of stakeholders of the European food chain as well as authorities and scientific experts were included in the study as they all have a merit as information sources in the food chain (Houghton, et al., 2008). Two research questions are formulated. The first research question asks *How social media can contribute to the communication of food risks and benefits according to experts and stakeholders in the food chain (RQ1)*. The second research question tackles the issue that stakeholders might have different opinions, perspectives and communication objectives compared to experts (Shepherd, et al., 2006), and also with regards to social media usage. *To what extent do stakeholders and experts hold different views towards social media? (RQ2)*.

#### **1.4.2 Research objective 2: Examine the potential role that social media can play for consumers' information acquisition**

The growing importance of social media in everyday life has increased the influence and reach of interpersonal sources which play an important role in incidental information acquisition. Social media applications are built around the concept that personal knowledge, experience and information is automatically shared with one's surroundings (Scanfeld, et al., 2010). For example, Facebook enables users to passively consume information from their network through the News Feed feature (Lampe, et al., 2012). Due to a lack of empirical evidence our third research question investigates *Which motives and barriers consumers have to use or avoid information about food risks through social media (RQ3)*. As stated by Kaplan and Haenlein (2010), social media is defined as a group of Internet-based applications. According to the theory of information acquisition, information retrieval depends both on the information seeker and the medium (Foster, 2004). Therefore it is necessary to know *Which social media applications are perceived as most useful to acquire information about food risks (RQ4)*. As both the individual and channel will influence information acquisition, it is necessary to know which individuals will be more open to use social media: *Which consumers see opportunities to acquire information about food risks from official sources through social media (RQ 5)*.

#### **1.4.3 Research objective 3: Investigate the potential value of social media for consumers who seek information about food-related risks**

As the digital environment provides an enormous potential for information storage, social media creates new opportunities for consumers to seek food safety information online (Barnett, et al., 2011; Brossard & Scheufele, 2013). The use of metadata, built-in search engines and information sharing on social networking sites can help users to retrieve information within the huge supply of online content. Therefore, our next question is *Which role social media can play besides more common information channels for consumers who seek information about food related risks (RQ 6)*. As previously discussed in the RISP model (Griffin, et al., 1999) and food communication literature (Kuttschreuter, 2006; Verbeke, 2005b), many determinants can influence information need and reaction to information. A logical question that follows from this issue is *Which is the motivational, perceptual and socio-demographic profile of consumers who are inclined to use social media (RG 7)?*

#### **1.4.4 Research objective 4: Characterise the potential use and role of deliberative engagement between consumers and communicators**

Successfully engaging consumers in a dialogue may provide opportunities for more effective communication about food-related risks and benefits. The rapid growth of Internet use and in particular the rise of web 2.0, has raised new possibilities and new mechanisms for consumer deliberation (Xenos, 2008), making the online space a suitable context for the exploration of consumer views on food-related issues. A first research question in terms of capturing the process of online deliberation deals with new elements of online interactivity. *Can deliberative engagement be assessed as a behavioural measure and if so, how is this measure composed (RQ 8)?* Secondly, we wanted to assess if deliberation could enhance effective communication. Therefore, we investigated *What the effect of online deliberation was on information recall (RQ9)*. As many communicators have an interest in engaging the public in dialogue (Thackeray, et al., 2012), a better understanding of those determinants was necessary. The final research objective raises the question *Which factors influence deliberative activity of consumers (RQ 10)*.

### **1.5 Contributions of this thesis**

#### **1.5.1 Conceptual contribution**

The conceptual framework developed for this dissertation combines existing models in food communication and emphasizes the consumer-driven approach. A review of frameworks and theories currently used in food risk and benefit communication by Frewer et al. (2013) indicated that the main focus of these frameworks has been on consumer perception and behavioural intention towards food information and less on the process of the communication itself. Examples of these theories are the Theory of Planned Behaviour (TPB) (Ajzen, 1991; Lobb, Mazzocchi, & Triall, 2007; Verbeke & Vackier, 2005), dual processing models (Chaiken, 1980; Frewer, Howard, Hedderley, & Shepherd, 1997) and the Social Amplification of Risk Framework (SARF) (Frewer, Miles, & Marsh, 2002; Lofstedt, 2006; Pidgeon, Kasperson, & Slovic, 2003).

In this dissertation, the main focus is directed towards the communication process and channels used in communication of food-related risks and benefits. Theories focussing on the communication process itself will gradually become more important to incorporate in future food communication as the introduction of web 2.0 has led to drastic changes in information flow (Winer, 2009). In this area of research, our framework expands on the existing theories used in food communication. Where the theory of information seeking and processing has received attention among researchers

(Kuttuschreuter, 2006), other communication theories such as the complementary framework, theories on information acquisition and public participation have received far less attention to our knowledge.

### **1.5.2 Methodological contribution**

The methodologies applied in this dissertation are in line with generally accepted practices. The obtained results were assembled with qualitative, quantitative as well as experimental research designs. The combination of these methodologies provides a broad overview for discussion. The focal topic of this dissertation was to measure people's reaction to the concept of social media. Exploratory research showed that this concept was difficult the grasp for participants and could be best explained by examples of social media. Therefore, a construct was made based on a variety of the best known applications at the moment of the executed studies including: social networking sites as Facebook, micro-blogging websites as Twitter, forums, blogs and the video-sharing website YouTube.

Online deliberation is a fairly new research area and our approach explored deliberation as a manifest of individual activity. One of the goals of this dissertation was to develop a behavioural measure to capture online deliberation by means of the newly developed software VIZZATA™. This tool can offer a simple and practical solution to gaining access to what consumers think about communications ([www.vizzata.com](http://www.vizzata.com)). The software allowed us to operationalize online deliberation in terms of four indicators: the number of questions asked by users, the number of comments left, the number of hyperlinks accessed and the time spent on reading online stimulus material. VIZZATA™ allows researchers to elicit individual opinions of consumers and leaves less room for 'group-thinking' or convergence of opinions what can appear in focus groups. It allows to track consumers reactions to communication, can be done quicker and cheaper than individual interviews and it allows to engage participants in a continued conversation compared to a standard survey method (FoodRisC, 2013).

### **1.5.3 Empirical contribution**

The empirical contribution of this dissertation lies in the nature of the topic investigated. Most research studying food risk and benefit communication has not yet integrated the use of social media as a communication channel. Research on channel credibility has mainly focused on mass media as dominant channel in food risk and benefit communication as it has been the traditional way to spread information (Noar, 2006). The media have a profound influence on management and

consumer perceptions of food-related risks and benefits (Houghton, et al., 2008; McCarthy & Brennan, 2009; Verbeke, 2005b). Not only does the media transmit official risk messages, they also create, interpret and shape risk and benefit information into a format that is considered to be understandable for the general public (McCarthy, Brennan, De Boer, & Ritson, 2008). The media choose information to report, not necessarily based on reliable sources but on what seems interesting given the professional limits on space, time and audience capacity (Weingart, Engels, & Pansegrau, 2000).

Social media is opening a window of opportunity for communicators, from the early detection and surveillance of food contamination incidents, to the interactive communication of food benefits with the public. Despite the many opportunities that social media present, there are some apparent key challenges which will need to be carefully considered in order to successfully incorporate social media into future communication strategies relating to food risks and benefits. This dissertation tackles both opportunities and threats of social media use by means of an in-depth examination of the view of communicators and consumers on its use in food risk and benefit communication. For the first time in Europe, empirical data are gathered about consumers interest and potential use of social media with respect to information about food risks. Our work evaluates the role of social media in the current media landscape as well as the differences within its own variety of applications. In addition, the causes and consequences of new forms of information exchange, that are made possible through web 2.0 applications, are critically revised in the context of food-related risk and benefit information.

## **1.6 Research design and data sources**

Data required to meet the research objectives and to investigate the research questions are collected through qualitative, quantitative and experimental research procedures. Table 1.2 gives an overview of the data collected and used in this dissertation. Four studies were executed independently from each other, including different samples of respondents, and at different points in time. A more detailed description of the different study samples and methodologies applied, are included in the methods section of the respective chapters. The present section provides an overview of the methodologies between these four studies or data collections in the order that the studies were conducted.

Table 1.2: Research design and data sources

Design	Part I: communicator	Part II: consumer		
	Study 1: Communicator perspective	Study 2: Information acquisition	Study 3: Information seeking	Study 4: Consumer deliberation
	Chapter 2	Chapter 3	Chapter 4	Chapter 5
Qualitative	<i>In-depth interview including SWOT method n =71</i>			
Quantitative	<i>Email survey including SOR method n=23</i>	<i>Consumer survey n=497</i>	<i>Consumer survey n=1622</i>	
Experimental				<i>Online study VIZZATA method n=150</i>

The first study examines communicators' perspectives on the potential use of social media in food risk and benefit communication. The evaluation of social media is based on a qualitative SWOT-analysis (i.e. an analysis of Strengths, Weaknesses, Opportunities and Threats) and a quantitative SOR-analysis (Strategic Orientation Round) to translate the statements in the SWOT analysis into practical strategic objectives. In the first stage, semi-structured interviews were carried out with a purposive sample of scientific experts and authorities (n=33) as well as stakeholders (n=38) from six European countries: Belgium, Ireland, Italy, Latvia, The Netherlands, and Spain. The interviews were audio-recorded using a tape recorder and subsequently transcribed verbatim. Prior to carrying out the consumer interviews, a number of pilot studies (2-3) were run in each country to ensure that the questions were easily comprehended and that the order of the questions was appropriate. These pilot studies also allowed the interviewers to become comfortable with the interview guide. Once all pilot studies were completed, feedback was considered and necessary and appropriate changes were made to the interview guide. Researchers in the participating countries then proceeded to carry out the interviews. Interviews took place from December 2010 to April 2011. In the second stage (October 2011), participants of the qualitative interviews were contacted again through electronic means to take part in the SOR scoring stage of the study. Participants were informed about the meaning of the SWOT components as resulting from the first phase and they were provided a scoring matrix. 13 experts and 10 stakeholders completed the quantitative stage.

Data of the second study were collected through a consumer survey in Flanders, Belgium, during the period of March 2012 by means of self-administered structured questionnaires. A total sample of 479



consumers participated in an online survey to determine consumer interest in social media as a channel to become informed concerning the risks of pesticide residues on vegetables. Participants with a wide range of socio-demographic backgrounds were collected through a research agency

The third study is based on a pan-European consumer survey with 1622 participants from eight countries including Belgium, Germany, Ireland, Italy, Portugal, Spain, the Netherlands and the U.K.. Participants were recruited during August 2012 by a research agency and participated in a 30 minute online survey to explore information seeking behaviour related to food risks and benefits of red meat and vegetables. Participants were randomly selected from nationally representative consumer panels managed by the market research agency responsible for the fieldwork data collection. The questionnaire was developed in English and afterwards translated and back-translated into the different national languages of the participating countries.

Data of the fourth study were collected with the new software VIZZATA™, developed to acquire a better understanding of the nature of consumer deliberation. The feasibility of the online software was initially explored in a project funded by the UK Wellcome Trust (Barnett et al., 2008) and sought to engage people in a way that approximates the everyday processes of information seeking and sense making. During July and August 2012, 150 participants from the UK, Belgium and Portugal completed two phases of an experimental study about the risks and benefits of red meat, to develop a behavioural measure of deliberative activity. The participants were recruited through a market research agency and were selected in order to have a sample meeting particular study inclusion criteria (e.g. non-vegetarian, consuming red meat at least once a week) and with a wide range of socio-demographic characteristics (e.g. diversity in occupational backgrounds, participants with and without children).

### **1.6 Thesis outline**

This doctoral dissertation is a compilation of papers that have been published, accepted or submitted as contributions to international peer-reviewed journals, covering the scientific disciplines of food science & technology, communication, and agricultural economics & policy. Figure 1.2 gives an overview of the different parts of this thesis and its chapters related to the research framework.

First, the communicators perspective on the use of social media as a channel in food risk and benefit communication is examined. *Chapter 2* identifies the perceived strengths and weaknesses of social media for food risk and benefit communication, as well as the opportunities and threats facing the

use of social media according to experts and stakeholders. All results reported in Chapters 2 are derived from study 1 combining the qualitative SWOT method with the quantitative SOR method.

Secondly, the consumer perspective on social media as an information channel is examined for the different levels of consumer engagement, i.e. information acquisition, information seeking and public participation. *Chapter 3* examines consumer interest in social media in becoming informed about the risks of pesticide residues on vegetables. The findings are based on a national survey data. *Chapter 4* defines consumer segments based on preferences for communication channels to seek additional information about vegetable risks, based on pan-European survey data. This chapter allows to understand the role of social media beside traditional and online media. The introduction of a consumer-dominated channel also enables that individual consumers have new tools to actively deliberate with their online community. The goal of *Chapter 5* is to acquire insight into the personal impact and predictors of deliberative activity through an experimental approach.

Finally, *chapter 6* provides the general discussion of the results obtained in the framework of the research objectives, propositions and hypotheses. Conclusions, policy implications, limitations and perspectives for further research are proposed.

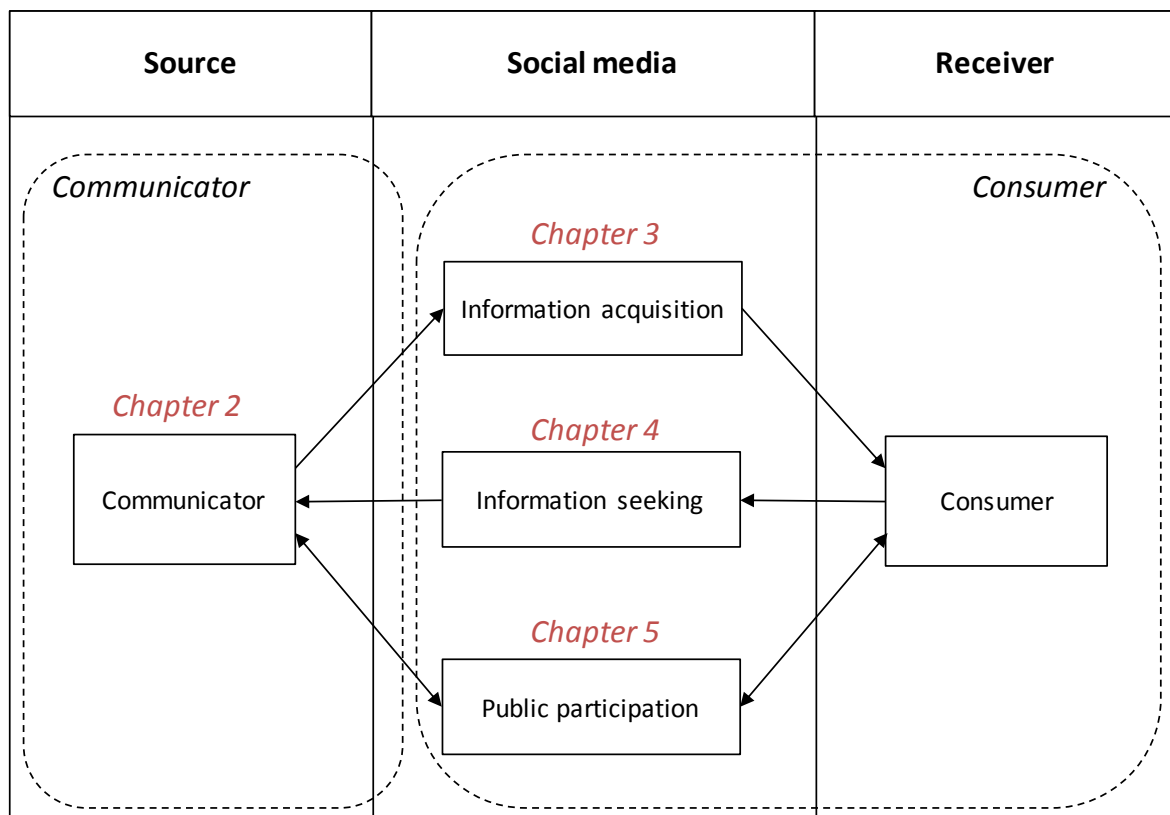


Figure 1.2: Thesis outline in relation to the research framework



## Chapter 2

# Social media as a useful tool in food risk and benefit communication? A strategic orientation approach

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This chapter is based on:

Rutsaert, P., Pieniak, Z., Regan, Á., McConnon, Á., Kuttschreuter, M., Lores, M., Lozano, N., Guzzon, A., Santare, D., & Verbeke, W. (2013). Social media as a useful tool in food risk and benefit communication? A strategic orientation approach. *Food Policy*. under review (resubmitted).

### **Abstract**

Although considerable progress has been made in understanding the determinants of risk perception and in identifying the necessary components of effective food risk and benefit communication, this has not been matched with the development of efficient and appropriate communication tools. Little work has been done examining the implications of the explosion of new media and web technologies, which may offer potential for improving food risk and benefit communication. First, this chapter examines the views of stakeholders (n=38) and experts (n=33) in the food domain on the potential use of these emerging media for food risk/benefit communication. Based on in-depth interviews in six European countries (Belgium, Ireland, Italy, Latvia, Spain and The Netherlands), strengths, weaknesses, opportunities and threats (SWOT) of social media in food risk and benefit communication were identified. Second, a Strategic Orientation Round (SOR) was used to evaluate the relative importance of the SWOT components according to stakeholders (n=10) and experts (n=13). Results show that both stakeholders and experts confirm a future role of social media in food risk and benefit communication. Strengths as speed, accessibility and interaction make social media an interesting tool in crisis communication or issue awareness raising. Weaknesses as the lack of a filter, low trust, the risk of information overload and a communication preference for traditional media are acknowledged.

*RQ 1: How can social media contribute to the communication of food risks and benefits according to experts and stakeholders in the food chain?*

*RQ 2: Do stakeholders and experts hold different views towards social media?*

## 2.1 Introduction

The communication of risks and benefits in relation to food has gained growing attention over the last decennia (Renn, 2008). The purpose of this communication can vary greatly; building trust and consensus, creating awareness, educating, influencing perceptions, attitudes and beliefs, promoting action and changing behaviour (McGloin, et al., 2009). Good communication practice seeks to bridge the divides between scientific experts, policy makers, health practitioners, industry marketers, and consumers. It is important to acknowledge that consumers can diverge in their responses to the same information, with many factors shaping their assessments and perceptions of a risk/benefit issue (Barnett, et al., 2011). Effective communication requires identification and thorough understanding of the target audience's needs and appropriate management of the information provision so that it optimally addresses particular needs. Much research has been done to examine the determinants of risk perception and to identify the necessary components of effective food risk communication (e.g. Covello & Sandman, 2001; Lofstedt, 2006; McCarthy & Brennan, 2009; Rollin, et al., 2011). However, this research mainly focuses on offline communication. More research is needed to study the implications of the explosion of online media and web technologies.

The traditional communication model used in the food sector is based on the knowledge-deficit model of communication: an information transfer and educative process involving the one-way flow of objective scientific information from an authoritative expert source to the public (Hilgartner, 1990; Irwin & Wynne, 1996). The goal of this communication strategy is to persuade the public to accept expert risk judgements and to follow the advice and guidelines without questioning. However, experts and lay people perceive, judge, prioritise and deal with risks differently. Therefore, food consumers often ignore or query the risk assessments and advice of scientists, the food industry and/or public bodies. Awareness of this 'expert-lay discrepancy' (Hansen, et al., 2003) has led to a refocus on risk communication as the interactive exchange of information and opinions throughout the risk analysis process (Fischhoff, 2011). While there is an acceptance for the importance of public interaction and exchange of information, the traditional way for communicators to spread their message remains to be through mass media (Noar, 2006). The use of traditional media allows communicators to reach a large audience but neglects the importance of interactivity and the active role of consumers in the communication process.

This chapter aims to take the first step towards the provision of evidence-based guidelines about the potential opportunities and challenges of social media in the context of food risk and benefit communication. The objective is to comprehend how social media can contribute to the

communication of food risks and benefits according to experts and stakeholders in the food chain. Secondly, the chapter will develop appropriate strategies for optimal social media use in the future. Because of its exploratory nature, the first goal will be answered using a qualitative approach, i.e. the SWOT method (Fine, 2009). This approach focuses on the identification of the perceived strengths and weaknesses of social media for food risk and benefit communication, as well as on the opportunities and threats facing the use of social media. The second goal is executed by using a more quantitative approach, through performing a Strategic Orientation Round (SOR) (Van Wezemael, Verbeke, & Alessandrin, 2013) to investigate the possibilities for wider application and further dissemination of social media use.

## **2.2 Material and methods**

### **2.2.1 Participants**

The goal is to gain a broad view of the ideas about the usefulness of social media in communicating about food risks and benefits. Authorities and scientific experts are traditionally seen as the responsible actors for informing the public about risks and benefits (Frewer, 2004). Authorities and scientific experts in the current study will further be referred to as 'experts'. The main focus of the risk communication literature has traditionally been on the distinction between expert and lay points of view (Hansen, et al., 2003; Verbeke, et al., 2007). Research by Shepherd, et al. (2006) and Houghton, et al. (2008) recognises that many other stakeholders of the food chain like the media, producers and retailers also fulfil an important role in the communication landscape. These stakeholders might have similar expertise and knowledge as the experts, but different opinions, perspectives and communication objectives, e.g. due to other or vested interests. As this might lead to alternate views on the value of social media, different types of stakeholders of the European food chain have also included in the study.

A total of 33 in-depth interviews were carried out with experts. Interviews took place with European experts from (i) regulatory authority stakeholders including food safety agencies, (ii) academic stakeholders, and (iii) government sector officials and/or policy makers in six countries. In some cases interviews were carried out with two individuals from an agency, i.e. with a person with a scientific-political role in the organisation, and with a person with a communications role in the organisation. These institutes or organisations were responsible for food safety management and communication at regional, national or European level.

A total of 38 in-depth interviews were carried out with individuals from relevant stakeholders in the European food chain. Different types of stakeholders vary not only in their values and concerns but also in their technical expertise and in their level of involvement with particular issues (Shepherd, et al., 2006). Stakeholders included are: (i) media representatives including journalists and media producers, (ii) non-governmental and consumer organisations and (iii) industry representatives including food retailers and producers, trade bodies and farmers' unions. The rationale for selecting these categories of stakeholder participants was to ensure a representation of stakeholders from across the food chain.

### **2.2.2 Methods**

The evaluation of social media in the domain of food risk and benefit communication was performed using the mixed sequential design of Van Wezemaal, et al. (2013). Data collection and analysis were executed in two stages. The first stage consisted of a listing of SWOT components. The second stage consisted of scoring of a SWOT matrix and performing a quantitative analysis through a Strategic Orientation Round (SOR).

#### 2.2.2.1 Qualitative research stage

Researchers have traditionally used the Technology Acceptance Model (TAM) of Davis (1989) as the theoretical foundation for the adoption of a new technology. This model focuses on two basic factors of a technology: perceived usefulness and perceived ease of use by future adopters. As the TAM model helps to understand why users come to accept and utilize a technology, also the adoption of social media has been evaluated using this model (Lee, Xiong, & Hu, 2012; Lin & Lu, 2011; Steyn, Salehi-Sangari, Pitt, Parent, & Berthon, 2010). However, literature on technology adoption, including the TAM model, as well as the Innovation Diffusion Theory (Rogers, 1995) or the process framework (Tang & Ang, 2002) focus mainly on an individuals' adoption of a technology. In their literature discussion, Nah and Saxton (2012) proclaim that these theories might be less suitable for organizational selection of a communication technology. Therefore, organisations need to find and apply an alternative method to evaluate possible adoption of a technology. Organisations should take into account the environment they are functioning in to evaluate possible adoption of a technology. The SWOT method may prove useful in this respect. This method is used traditionally used as a strategic planning for a company or sector (Vermeire, Gellynck, Bartoszek, & Rijswijk, 2006;). This view has been broadened by the work of Van Wezemaal, et al. (2013) who have utilized this technique to evaluate a particular research method. Therefore, this study has opted to apply the SWOT method as an evaluation technique for a new communication technology.

The SWOT-analysis (i.e. an analysis of Strengths, Weaknesses, Opportunities and Threats) is a strategic planning tool used to evaluate in a systematic way the external threats and opportunities, and the internal weaknesses and strengths of a project (Fine, 2009). A SWOT analysis is a stepwise method involving different stages of information and data collection, consisting of specifying the project's objectives and identifying the internal and external factors that support or hinder achieving the specified objective, i.e. improving food risk and benefit communication through social media. The SWOT analysis does not only evaluate the perception of social media itself, but also provides insights into the further possibilities of applying social media in food risk and benefit communication. This allows the identification of the main points of interest for future strategy development (Sabbe, Verbeke, & Van Damme, 2009). SWOT analysis is typically done by so-called "prime witnesses", i.e. people who are well familiarised with the topic.

In the present study these were stakeholders and experts linked to food risk and benefit communication from six European countries. The diversity in backgrounds of participants ensured variability in the obtained SWOT components. During the interview, the participants were asked to list possible internal strengths and weaknesses, and external opportunities and threats of the use of social media in the domain of food risk and benefit communication. After the aggregation and translation of the transcripts into English, those lists were filtered from repeated and overlapping answers. Misclassifications of internal (strengths and weaknesses) and external (opportunities and threats) characteristics were relocated by the researchers. The answers in the filtered list were categorized based on their content and coherence, resulting in a final list of five strengths, five weaknesses, five opportunities and five threats. Subsequently, the SWOT components were checked for consensus across countries. All components were mentioned in at least five of the six countries, except for the component "low consumer interest in social media" which was only mentioned in Belgium, Ireland and Spain.

#### 2.2.2.2 Quantitative research stage

In the second (i.e. the quantitative) stage of the study a SOR analysis was performed in order to translate the statements in the SWOT analysis into more practical strategic objectives. The SWOT-analysis is mainly a descriptive and synthesising instrument. Within the analysis, no hierarchy between the components is established and therefore there is no solid base from which to define a strategy. However, based on the qualitative SWOT method, variations have been developed that make the step to a quantitative strategic approach (Dyson, 2004). One such variation is the Strategic Orientation Round (SOR) method (Van Wezemael, et al., 2013). The SOR analysis relies on the



outcome of the SWOT analysis. The SOR is a planning instrument that is used to define strategic objectives. While the SWOT analysis makes a situation analysis, the SOR analysis is used to make the step from analysis to strategy. The advantage of strategic orientation is that it explicitly links diagnosis and assessment to strategic decisions and action planning, while the connection between analysis and planning is often implicit.

The identified SWOT components were combined in a matrix where the rows were filled with the internal strengths and weaknesses, and the columns with the external opportunities and threats. In this matrix, each of the internal components was confronted with each of the external components. Next, the involved experts and stakeholders were asked individually to attribute scores to every single cell of the matrix. These scores represented their answers on four questions related to the quadrant encompassing the cell (see Table 2.1). Scores were attributed according to two guidelines: firstly, a maximum of 12 points could be attributed to each column; and secondly, each single cell score had to be within the range of 0 to 3, indicating points of no (0) / low (1) / medium (2) / high (3) importance.

Table 2.1: Meaning of the quadrants of the SWOT matrix

	Opportunities	Threats
Strengths	To what degree does the strength facilitate to benefit from the opportunity?	To what degree does the strength allow to cope with the threat?
Weaknesses	To what degree does the weakness prevent to benefit from the opportunity	To what degree does the weakness prevent to cope with the threat

The attributed scores in the SOR matrix can be analysed on different levels. Aggregated scores per quadrant reveal the most relevant strategic choice concerning the use of social media. This level gives an overview of what would be the best (main) strategy for the use of social media in food risk and benefit communication. Secondly, the total score per strength, weakness, opportunity or threat can be analysed. This level of analysis makes a distinction between the different items found in the qualitative stage where all the items received an even weight. In this stage, it is possible to rank them according to their importance. Thirdly, the aggregated scores per cell indicate the relevance of each cell relative to other cells of the SWOT matrix. This allows identifying the key points of interest in using social media in food risk/benefit communication.

### **2.2.3 Data collection**

In the first stage (January-March 2011), face-to-face semi-structured interviews were carried out with a purposive sample of scientific experts and authorities as well as stakeholders from six participating countries: Belgium, Ireland, Italy, Latvia, The Netherlands, and Spain (Table 2.2). These countries were chosen to represent a diversity of food governance structures, exposure to past food crisis episodes, as well as reflecting a geographical spread in Europe. The SWOT method was part of a larger semi-structured interview concerning the communication of food risks and benefits. Other parts of the interview covered perception of food risks and benefits, the conceptualisation of a food crisis and the use of communication tools in general.

Table 2.2: Number of participating stakeholders and experts in the qualitative and quantitative stage (type of stakeholder and country)

		Qualitative stage							Quantitative stage
		Belgium	Ireland	Italy	Latvia	The Netherlands	Spain	Total	Total
Expert	Regulatory authority stakeholders	2	6	6	3	1	3	21	6
	Academic stakeholders	2	2			1	2	7	3
	Government sector officials			2		1	2	5	3
	Total	4	8	8	3	3	7	33	13
Stakeholder	Media representatives (journalists and media producer)	2	1	2	2	2	2	11	4
	Non-governmental and consumer organisations	1	2	1	1	1	1	7	3
	Industry representatives (food retail and production, trade bodies, farmer unions)	3	3	5	3	4	2	20	3
	Total	6	6	8	6	7	5	38	10

In the second stage (October 2011), participants of the qualitative interviews were contacted again through electronic means to take part in the SOR scoring stage of the study. Besides the scoring matrix, extra information about the SWOT components was provided. In total, 33 scientific experts and authorities as well as 38 stakeholders took part in the qualitative stage while 13 experts and 10 stakeholders completed the quantitative stage.

## 2.3 Results

### 2.3.1 Qualitative research stage

The five strengths, weaknesses, opportunities and threats is presented in table 2.3. The list of items that was used to identify the SWOT components is provided in Appendix I, together with the prevalence of the different items per country.

Table 2.3: The SWOT components according to the stakeholders and experts

Strengths	Weaknesses
Speed	Low trust in source
Interaction	No filter
Peer-to-peer awareness	Continuous investment needed
Accessibility	Privacy concerns
Technological possibilities	Negative image
Opportunities	Threats
Need to reach specific audience	Fast changing area
Crisis communication	Information crowd and overload
Popularity of communication technology	Preference for traditional media and channels
Group feelings	Low consumer interest in online information
Need for unbiased information	Emotional behaviour

#### 2.3.1.1 Strengths of social media in food risk and benefit communication

Strengths are intrinsically linked to social media and represent a possible source of competitive advantage. Speed was identified as a first strength by stakeholders and experts. Social media is the perfect tool to speed up communication and, for all practical purposes, it speeds up awareness. It is a way to get a message out instantly and it gives the opportunity to communicate in “real-time”.

*“Yeah (speed is a strength). Because like I say you are first to the audience with the message.”  
(Ireland, food safety agency)*

Secondly, interaction was perceived as a strength of social media. It offers interested parties the opportunity of increased involvement in the communication process. There is the possibility to interact with the public and organizations receive instant feedback from consumers.

*“We would like to receive citizens’ feedback by reporting social issues like: “I have seen these yogurts in X supermarket and they do not have an expiry date.” (Spain, governmental body)*

The third strength according to stakeholders and experts was accessibility. The development of and increased access to the Internet is a key driver in the emergence of new media. Social media tools are in many cases easily accessible and require low technological knowledge. And on top of that most popular tools like Facebook, YouTube and Twitter are free to use.

A fourth strength, peer-to-peer awareness was mentioned which relates to the possibility to see interests of “friends” or “followers”. Consumers became valuable channels themselves to spread a message.

*“I like the thing of, if I read something on a website...and I like it (on Facebook) and you are my friend: you like it too. If we had something up about the benefits of eating oily fish and I like it and if you are my friend and you like it, you will probably like it because I like it, as opposed to because the (food safety agency) has told you. I have kind of inadvertently told you so I think that is what is amazing... the power of it.” (Ireland, food safety agency)*

The technological possibilities of social media were perceived as the fifth strength. Social media tools make it easy to post lots of information and material, including photos and videos online and are a growing field in combination with mobile technologies.

#### 2.3.1.2 Weaknesses of social media in food risk and benefit communication

Weaknesses are intrinsically linked to social media and represent a source of possible competitive disadvantage. A first weakness relates to low trust in the (information) source. Sources on social media can be anonymous and unidentifiable which lowers trust in social media as an information source. The participants mention the lack of control on accurate information, on the source and the anonymity of lots of information posted often by lay people. This often creates a gap between facts and perceptions. This low trust in source can be enhanced by the speed of social media. The rapid spread of a false message, e.g. about potential food crisis can have severe consequences. There is no room to check the value, the source or the dependability of a message.

The absence of a filter is seen as a second weakness of social media. Everybody (scientific experts and authorities, companies, consumers) is able to post information online through social media and can become a source of information. There is no filter with respect to accessing social media and very few barriers to stop people from publishing what comes to mind.

*“Everybody can be a source of information, and obviously, not everybody is a trusted source of information. We are aware of what is said on this medium, but we need to filter and contrast the information.” (Spain, media producer).*

Thirdly, continuous investment of human capital and time is needed to stay up to date in the fast evolving world of social media. Pressure on time is perceived negatively by a lot stakeholders and experts.

*“I do not understand how people have time to sit on Twitter writing their thoughts down on different issues...Trying to service something like that would be very difficult. And that is one of the things about social media meaning the amount of time it actually takes and the resources you have to put in to keep everything going.” (Ireland, food safety agency)*

Fourthly, concerns about intellectual property rights, privacy and data protection are regularly raised as disadvantages in relation to social media.

*“It is in some cases important to whom you send your information. But once it is spread on social media, it can become an unguided projectile.” (Belgium, NGO)*

Fifthly, a negative image of social media is seen as a weak spot. Social media are linked to advertisement, enjoyment, spread of extreme views, bullying, etc., and may possess a negative image among some population groups. In several cases, lack of familiarity is one the major barriers for not using social media in their organization and particularly for food risk and benefit communication; there is a fear for the unknown.

#### 2.3.1.3 Opportunities for the use of social media in food risk and benefit communication

Opportunities are new perspectives and chances for social media that might provide for its application and usability. A first identified opportunity is the need to reach specific audiences. More and more situations arise where a targeted, specific audience should be used. Especially in terms of reaching a younger audience, social media can provide opportunities. But the perceived limited demographic audience and the focus on young people is also seen as a limitation.

*“Thus, once you have nailed down your target group, social media can be very effective. If one compares that with a TV-campaign, a TV-campaign is like shooting a very large shower of bullets, and if one aims at pregnant women, one hopes to hit some of them. But with this (social media), when they are pregnant and are looking for “pregnant”, they find you. That can be the benefit of social media.” (The Netherlands government body)*

Another important audience which is active on social media is traditional media. Many journalists increasingly rely on social media as a source of information and news.

*“The odd thing is, we are primarily followed by professionals. I do have a thousand followers now, but they are mostly journalists, dieticians, etc. Now we know how they perceive the information that is communicated to them.” (The Netherlands, government body)*

Crisis communication is seen as a second opportunity for communication through social media. A growing number of situations arise where a large audience rapidly needs to receive information.

*“Social media is useful in a crisis, not to explain something, but to reach many people or give a simple message.” (Belgium, food safety agency)*

Thirdly, there is a high current societal popularity of communication technologies involving the Internet and mobile phones. Several experts and stakeholders saw this growing market as an opportunity to spread their message in, for instance, applications for cell phones and tablets. This is believed to result in high reach.

Community feeling is recognised as a fourth opportunity. Consumers with common interests congregate in online communities. The experts and stakeholders were very positive about the opportunity to engage with these communities and share expertise and experiences. The possibility of having a conversation with the public gives the opportunity to identify needs and worries in relation to food.

*“The community feeling, even if it is an online community, is a strength of social media. You are part of a group and I think it is important for a lot of people to be part of a group.” (NGO, Belgium)*

Finally, the experts and stakeholders recognised an opportunity to provide detailed, unbiased and easily accessible information about food, based on reliable facts that can be consulted when a need is felt. Social media easily reach large audiences. Traditionally, only mass media organizations were able to reach large amounts of people with information.

#### 2.3.1.4 Threats for the use of social media in food risk and benefit communication

Threats are negative external aspects that might cause problems or losses with the use of social media in food risk and benefit communication. A first threat of social media is the fact that the online world is a fast changing area. Online technologies are continuously evolving and changing with the consequence that the tools of today can be outdated tomorrow. Some participants feared to invest in a domain that might be redundant in a few years.

*“From my point of view, one inconvenience is that the medium evolves too fast and once you get used to a tool, they change it again.” (Spain, scientific research institute)*

Secondly, the overload of information was identified as a threat. Users are confronted with an overload of information and communication. Information gets lost in the noise. Because of all this existing noise, it is hard to get your message through according to the respondents.

*“One and all can put on there what they want about food, it is a bit a jungle.” (Belgium, food safety agency)*

Preference for traditional media and channels was discussed as a third threat. Traditional communication channels and media like radio, television and quality newspapers are preferred in allocation of resources to spread a message about food risks and/or benefits.

Fourthly, there is a low consumer interest in online information: Audiences choose their interests: People cannot be forced to listen or attend, and they will not spread information if it is not interesting enough.

*“It cannot be expected that you will reach groups who are not interested. One of the major target groups are the underprivileged and socially weak. I do not think we will reach them through Facebook. I do not think that the ones who are not interested will follow a group about food safety. We hit against the same boundaries as traditional media.” (Belgium, food safety agency)*

Emotional behaviour is recognized as a fifth threat. There is a tendency in society that people say/write what they want and do not think about possible consequences. The low threshold to post an opinion has as a negative effect that consumers react too fast and emotional without thinking about the consequences.



### **2.3.2 Quantitative research stage**

In the quantitative stage, stakeholders' and experts' opinions will be compared. Both are important actors in the food chain but with different goals, which can be reflected in the outcome of the strategic orientation round. In the following subsections, the results of experts and stakeholders will be discussed separately, differences between both groups will be discussed and suitable strategies and policy options will be compared.

The aggregated cell score indicates the relevance of each cell relative to other cells of the SWOT matrix. As comparisons are based on aggregated scores, differences in the number of participants between scientific experts and authorities (n=13) as well as stakeholders (n=10) result in different maximum scores. The cell score per participant ranges from 0 to 3 resulting in a maximum cell score of 39 for the experts and 30 for the stakeholders. The maximum score attributed per column (scores for opportunities and threats) per person is 12 resulting in maximum column scores of 156 and 120 for experts and stakeholders, respectively. There are no limitations in terms of total scores per row (scores for strengths and weaknesses); therefore these can be up to 390 and 300 for experts and stakeholders, respectively.

#### **2.3.2.1 Quantitative analysis of the results from the authorities and scientific experts**

Table 2.4 presents the total score of the 13 expert responses. First, the total scores the experts contributed to the different SWOT items were compared. Crisis communication (145) scores the highest among opportunities. Need for unbiased information (143), popularity of communication technology (141) and the need to reach a specific audience (140) also gain high scores as opportunities. However, need for unbiased information mainly scores high because of high scores for the weaknesses while the others have high scores related to the strengths. One major threat is identified: preference for traditional media channels (148). The most important strengths of social media according to the experts are speed (185), interaction (185), and accessibility (169). The most vital weaknesses are low trust in source (188) and the absence of a filter (156).

Table 2.4: Aggregated SWOT scoring matrix for experts (n=13; maximum cell score=39)

		Opportunities					Threats					Total		
		Need to reach specific audience	Crisis communication	Popularity of communication technology	Group feelings	Need for unbiased information	Fast changing area	Information crowd and overload	Preference for traditional media and channels	Low consumer interest in online information	Emotional behaviour			
<b>Strengths</b>		<b>First quadrant</b>					<b>Second quadrant</b>							
	Speed	18	34	17	10	11	90	26	17	22	11	19	95	<b>185</b>
	Interaction	23	19	16	27	14	99	17	21	15	16	17	86	<b>185</b>
	Peer-to-peer awareness	10	7	16	19	12	64	5	14	13	14	16	62	<b>126</b>
	Accessibility	25	20	18	13	15	91	23	14	16	17	8	78	<b>169</b>
	Technological possibilities	14	11	26	9	9	69	17	9	11	11	7	55	<b>124</b>
		90	91	93	78	61		88	75	77	69	67		
<b>Weaknesses</b>		<b>Fourth quadrant</b>					<b>Third quadrant</b>							
	Low trust in source	18	23	7	7	31	86	13	16	30	23	20	102	<b>188</b>
	No filter	8	18	7	7	29	69	5	23	17	19	23	87	<b>156</b>
	Continuous investment needed	12	4	18	7	1	42	25	8	6	6	4	49	<b>91</b>
	Privacy concerns	3	0	8	17	6	34	6	3	6	7	10	32	<b>66</b>
	Negative image	9	9	8	10	15	51	4	10	12	18	16	60	<b>111</b>
		50	54	48	48	82		53	60	71	73	73		
	<b>Total (Max = 156)</b>	<b>140</b>	<b>145</b>	<b>141</b>	<b>126</b>	<b>143</b>		<b>141</b>	<b>135</b>	<b>148</b>	<b>142</b>	<b>140</b>		

The aggregated cell scores in the first quadrant of the grid (confronting strengths and opportunities) indicate to what extent a specific strength allows for a communicator to gain advantages from a specific opportunity. The high score for crisis communication (91) is mainly a result of the possibility of fast information transmission through social media. The need to reach a specific audience (90) benefits from different strengths like the high accessibility and the possibility of interaction. The popularity of social media scores very good on all strengths but the highest score is given to the technological possibilities.

The aggregated cell scores in the second quadrant show whether a particular strength enables a communicator to cope with a threat. The threat of social media as a 'fast changing area' (88) is counterbalanced by speed and accessibility as two strengths. The threat of overload of information (75) can be mitigated by interaction; information networks and communities can assist in distinguishing useful information in the overwhelming supply. A preference for traditional media and channels (77) is revealed as the main threat for social media use in food risk and benefit communication but social media has one key strength; the speed of communication and information transmission.

The aggregated cell scores in the third quadrant indicate whether a weakness prevents a communicator from coping with the threat. Two weaknesses are fairly dominant in this area: low trust in social media as a source (102) and absence of a filter (87). Low trust source plays a major role in the most important threat of communication through social media i.e. the preference for traditional media and channels (71). The fact that sources on social media can be anonymous and unidentifiable is perceived as the greatest weakness compared to traditional media. This characteristic also plays an important role in the low consumer interest in online information and emotional behaviour. The threat of emotional behaviour also interacts with a lack of an information filter, which may lead to an enormous supply of information. The need for continuous investment is seen as the greatest drawback of social media.

The aggregated cell scores in the fourth quadrant indicate whether a weakness prevents a communicator from benefiting from a particular opportunity. In this quadrant, two weaknesses are highlighted: low trust in source (86) and the absence of a filter (69). They are both main reasons for not using social media as a tool to provide unbiased information to consumers (82). Low trust in the source is also a limitation of using social media for food crisis communication (54).

### 2.3.2.2 Quantitative analysis of the stakeholder results

Table 4 presents the total score of the 10 stakeholder's responses. The most appealing opportunity for the use of social media is the ability to reach a specific audience (119). Information crowd and overload (105) on the other hand is the biggest threat for communication through social media. The main perceived strengths of social media are its speed (155), interaction (144) and accessibility (136) which is similar to the views of experts. Low trust in source (118) and the need for a continuous investment (89) are identified as the main weaknesses.

Table 2.5: Aggregated SWOT scoring matrix for stakeholders (n=10; maximum cell score is 30)

		Opportunities					Threats					Total		
		Need to reach specific audience	Crisis communication	Popularity of communication technology	Group feelings	Need for unbiased information	Fast changing area	Information crowd and overload	Preference for traditional media and channels	Low consumer interest in online information	Emotional behaviour			
<b>Strengths</b>		<b>First quadrant</b>						<b>Second quadrant</b>						
	Speed	16	22	20	14	11	83	17	16	14	14	11	72	<b>155</b>
	Interaction	17	12	15	21	12	77	13	12	8	18	16	67	<b>144</b>
	Peer-to-peer awareness	14	9	17	19	14	73	8	10	9	10	11	48	<b>121</b>
	Accessibility	17	14	14	14	15	74	16	12	15	11	8	62	<b>136</b>
	Technological possibilities	15	13	12	13	11	64	13	6	11	8	4	42	<b>106</b>
		79	70	78	81	63		67	56	57	61	50		
<b>Weaknesses</b>		<b>Fourth quadrant</b>						<b>Third quadrant</b>						
	Low trust in source	13	14	8	6	18	59	12	12	15	10	10	59	<b>118</b>
	No filter	9	11	4	4	13	41	3	11	9	9	12	44	<b>85</b>
	Continuous investment needed	10	11	13	4	8	46	8	15	5	6	9	43	<b>89</b>
	Privacy concerns	2	3	6	12	5	28	4	9	8	7	9	37	<b>65</b>
	Negative image	6	4	6	6	4	26	4	2	8	6	10	30	<b>56</b>
			40	43	37	32	48		31	49	45	38	50	
<b>Total (Max = 120)</b>		<b>119</b>	<b>113</b>	<b>115</b>	<b>113</b>	<b>111</b>		<b>98</b>	<b>105</b>	<b>102</b>	<b>99</b>	<b>100</b>		

The aggregated cell scores in the first quadrant show the highest score for speed – food crisis communication combination (22). The opportunity to reach a specific audience (79) benefits from most strengths of communication through social media. The popularity of the channel (78) is related to the speed on one hand and the possibility to see and trace interests of friends on the other hand. This characteristic together with the possibility of interaction are also important for the opportunity of creating communities (81).

The second quadrant reveals the highest score for interaction as a strength to cope with low trust in online information (61). The threat that online technology is constantly evolving (67) can be countered by accessibility and the possibility of fast information transmission.

In the third quadrant, scores are in general relatively low. The need for continuous investment seems to be an important weakness in dealing with the threat of information overload (49) and the lack of trust in online sources in dealing with the high reliability of traditional sources (45).

The highest score in the fourth quadrant contributes to the low trust in sources on social media in relation with the need for detailed, unbiased and readily available information (48).

#### 2.3.2.3. Comparison of experts' and stakeholders' evaluations of social media

The overall scores of the SWOT analysis can be translated into strategic choices and related policy options, obtained by summing the scores per quadrant of each region in the SOR. Strategy is hereby understood as the way the internal strengths and weaknesses are used to grasp the most important external opportunities and tackle the most important threats (Van Wezemael, et al., 2013). The quadrant with the maximum score implies the main strategy, which can be offensive (strength-opportunity), defensive (strength-threat), clean-up (weakness-opportunity), or crisis (weakness-threat). A comparison of experts' and stakeholders' scores based on the overall strategy is presented in Table 2.6. The total scores per quadrant are compared to the maximum possible quadrant score taking into account the number of participants, the number of rows and the maximum column score of 12. The results suggest that for both groups an offensive strategy, i.e. exploiting strengths to take advantage of possible opportunities in the environment, is perceived as the most suitable strategy for using social media in food risk and benefit communication. The offensive strategy is dominant over the other strategies, though more so among stakeholders than experts. Experts tend to focus slightly more on the 'clean up' and especially 'crisis' strategies compared to stakeholders, meaning that they rate the weaknesses of social media more relevant to deal with than the stakeholders in relation to possible opportunities and threats.

Table 2.6: Proportion of the maximum score per quadrant for experts (n=13) and stakeholders (n=10)

	Opportunities	Threats
Strengths	Strategic choice: ATTACK (offensive)  Experts: 413/780 = 53% Stakeholders: 371/600 = 62%	Strategic choice: DEFEND (defensive)  Experts: 376/780 = 48% Stakeholders: 330/600 = 49%
Weaknesses	Strategic choice: CLEAN UP  Experts: 282/780 = 36% Stakeholders: 200/600 = 33%	Strategic choice: CRISIS  Experts: 330/780 = 42% Stakeholders: 213/600 = 36%

## 2.4 Discussion and conclusion

By its nature, social media offers a communication approach which enforces many of the key principles of effective risk communication. The goal was to examine how social media can contribute to the communication of food risks and benefits according to stakeholders and experts in the food chain. Both groups experts valued the attack strategy most, i.e. the use of offensive policy options exploiting or using strengths to take maximum advantage of possible opportunities. This entails that participants rate the opportunities that social media provide higher than the emerging threats. However, some differences seem to exist between the stakeholders and experts related to the appreciation of the different opportunities. This could be a result of differences in objectives held by stakeholders and experts in the field of communication related to food safety issues. Stakeholders in the food chain might be more interested in upgrading their own value while the main task of experts is public well-being.

Opportunities such as the need to reach a target audience and the high reach related to the popularity are perceived as very appealing according to both stakeholders and experts. Tailored communication should be congruent with individual message receivers' needs and characteristics, skills, abilities and motivations. Targeted communication is a topic frequently referred to in the literature (Barnett, et al., 2011; Burger & Waishwell, 2001; Verbeke, et al., 2008). Most studies confirm its importance in communication strategies however, practical guidelines are seldom given. An important target group frequently mentioned in the interviews are young people; they are perceived as a high-risk group when it comes to food related issues (McCarthy & Brennan, 2009). According to the study of McCarthy and Brennan, young people mainly struggle with message

credibility and a lack of awareness of food risks and benefits. A survey of Eurostat (Seybert, 2010) indicated that 80% of young Internet users (16-24 years of age) in Europe are active on social media which makes these tools very useful to communicate to a younger audience. Tools like Flickr and YouTube make it easy for organisations to share pictures and videos, which can be used by viewers on websites, blogs or other social media sites. Online games can provide informal learning environments for a wide variety of people, since they can be made with tailored messages and in ways suitable to reach different audiences.

For other opportunities, stakeholders and experts hold different views. One of the most important opportunities according to experts for the use of social media is communication in times of a food crisis. As argued in the introduction, social media is highly relevant as it presents the perfect tool to speed up communication. In addition, the opportunity of direct communication with the audience can establish trust and credibility as a reliable information source. Monitoring of consumers during a crisis can provide valuable input for authorities. For example, Twitter served as an early warning system during the swine flu outbreak in April-May 2009 in Mexico. A review of tweets was helpful to understand public concerns, keywords used and the profile of users who discussed that topic on the web (Kostkova, de Quincey, & Jawaheer, 2010).

Our findings show that social media is clearly viewed as having a positive application in times of a food crisis, however there is also a more negative aspect to consider. Social media may escalate a food crisis situation and create potentially unwarranted panic and hysteria. Emotional behaviour and the lack of a filter are elements that might re-enforce this. The social amplification of risk framework has been proposed as a support for explaining the reason certain risks are enlarged, or indeed attenuated (Kasperson, et al., 1988; Renn, 1991). This framework proposes that “events pertaining to hazards interact with psychological, social, institutional, and cultural processes in ways that can heighten or attenuate public perceptions of risk and shape risk behaviour” (Renn, 1991, p. 287). Given its pervasive nature in the public domain, it is likely that social media now plays an increasingly important role in the social and cultural processes involved in potentially amplifying, or attenuating public risk perception. In an unregulated and open network environment, a minor opinion or a local voice could mislead public understanding of risk by disseminating unreliable information and false assertions to the whole society (Chung, 2011).

The results indicate that stakeholders and experts value the attack strategy the highest, although some of the threats also deserve attention. New media have increased the accessibility of content, the amount of content and the number of people who can create and share that content (Freeman,



2012). This increases the risk for information overload (Koltay, 2012) and that is the main issue stakeholders struggle with. A necessity to reach consumers through these channels is a continuous investment of human resources and time. Experts on the other hand see a preference for traditional media in the allocation of resources as a main boundary of social media use. The traditional way for communicators to spread their message in the last decades was through mass media channels (Noar, 2006). A main advantage is the far reach of these channels but there are also some important disadvantages of traditional media use. Not only does the media transmit official risk messages, they also create and interpret risk and benefit information into a format that is considered to be understandable for the general public (McCarthy, et al., 2008). The media choose information to report, not necessarily based on reliable sources but on what seems interesting given the professional limits on space, time and audience capacity (Weingart, et al., 2000). The communication of food risks and benefits through a mediator also leads to loss of control. Social media on the other hand are often regarded as more interactive and dialogic than traditional media or a simple website (Schultz, Utz, & Goritz, 2011). Findings from the present chapter suggest that social media could fill the gap of direct communication to the consumer.

Social media tools offer the potential to enforce some of the key principles advocated for effective food risk and benefit as well as food crisis communication. There is no doubt that the rapid rise and extensive use of social media and social networking can provide an extension to traditional methods of communication. With more than two and a half billion people having access to the Internet in 2013 (Sanou, 2013) and a large and increasing percentage of citizens using social media, communication professionals and food and health policy makers are strongly recommended consider their use alongside their traditional outreach models. This chapter illustrates that a SWOT analysis is a valuable tool that allows to evaluate the perceived usefulness of a communication tool such as social media in food risk and benefit communication. The analysis also provides insight into the future possibilities and emerging threats. SWOT followed by SOR-analysis allows identifying key attention points and prioritising communication strategies involving the use of social media. Results from the SOR analysis indicate that stakeholders and experts may benefit from incorporating social media in their communication strategy. The use of social media will not be the answer for all communication difficulties but there are domains like crisis communication and interaction with consumers where one cannot ignore its possible benefits anymore.





## Chapter 3

# Consumer interest in receiving information through social media about the risks of pesticide residues

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This chapter is based on:

Rutsaert, P., Pieniak, Z., Regan, Á., McConnon, Á., & Verbeke, W. (2013). Consumer interest in receiving information through social media about the risks of pesticide residues. *Food Control*, 34(2), 386-392.

### Abstract

A consumer segmentation approach was used to determine consumer interest in using social media to obtain information concerning the risks of pesticide residues on vegetables. A total of 497 Flemish consumers participated in an online survey in March 2012 to assess interest in social media applications like Facebook, Twitter, YouTube, forums and blogs and Wikipedia as channels for receiving information about pesticide residues from official bodies. The participants were segmented in four clusters depending on their level of information sufficiency and level of interest in social media applications: 'very satisfied; interested' (24%), 'not satisfied; very interested' (28%), 'not satisfied; some interest' (25%) and 'satisfied; little interest' (23%). The segments with higher levels of satisfaction displayed a higher trust in oneself and in public bodies to deal with the risks of pesticide residues and also contained relatively more males. The segments with a higher interest in social media displayed a higher familiarity and a higher appreciation for the opportunities of social media. These segments also contained relatively younger participants. Popular channels like Facebook and Twitter scored low in terms of perceived usefulness, even among high users. Wikipedia on the other hand was perceived by all segments as the most useful and credible online source when it comes to information about risks of pesticide residues. Speed and accessibility were the main motives for using social media applications as an information channel while lack of trustworthiness was the main barrier.

- RQ 3: *Which motives and barriers consumers do consumers have to use or avoid information about food risks?*
- RQ 4: *Which social media applications are perceived as most useful to acquire information about food risks?*
- RQ 5: *Which consumers see opportunities to acquire information about food risks from official sources through social media*

### 3.1 Introduction

Risk perception research has shown that many consumers are concerned about the potential long-term health risks of pesticide residues in food (Miles & Frewer, 2001; Mondelaers, Verbeke, & Van Huylenbroeck, 2009; Williams & Hammitt, 2001). Despite the very low incidence of human poisoning from pesticide residues in food (Claeys, et al., 2011; Ferrer & Cabral, 1995), the Eurobarometer reports on food-related risks identified pesticide residues as a major food safety issue concerning the European public, with an increase in concern reported between 2006 and 2010 (European Commission, 2006, 2010). Findings from the German Federal Institute for Risk Assessment (2010) indicated that while there is considerable public interest about pesticide residues, information from official bodies often does not reach the public. As it is the goal of risk communicators to assist the public to make more informed judgments, improvements in providing official information to the target audience are needed. Social media may offer one such avenue for ensuring that the audience is exposed to and can easily access information on pesticide residues.

Social media might lead to new opportunities of targeting consumers with information, additional to the more traditional mass media channels which have mainly been used (Bruhn, et al., 1992; McCarthy & Brennan, 2009; Tiozzo, et al., 2011). Opportunities like accessibility of content (Freeman, 2012) and enhanced speed of communication (Sutton, 2010) could be motives for its use. However, the quality of the information could be questioned due to elements like anonymity of the sender's location, interests, role and identity (Mehrabi, et al., 2009). So far, there is limited knowledge about how different social media applications can be implemented as effective channels of communication for official information sources such as food safety authorities or governmental bodies. While consumers are exposed to more information than ever before, it is important to understand that more information does not necessarily mean better informed consumers. Verbeke (2005b) stressed that information should be properly managed and targeted to address particular needs as not all consumers are alike. Interested consumers could be engaged to purposefully seek information. For other consumers who are not inclined to seek information themselves, incidental information acquisition can play a significant role.

As information seeking behaviour controls how information can reach consumers, it is necessary to identify the main predictors of information seeking. With their model of Risk Information Seeking and Processing (RISP), Griffin, et al. (1999) proposed that 'information sufficiency' is the main predictor of information seeking. Information sufficiency is defined as the extent to which a person is satisfied with the amount of information they currently hold on a particular topic. Further studies on

the relationship between information sufficiency and information seeking have confirmed the importance of the gap between information held and information needed for information seeking behaviour (Griffin, et al, 2004; Kuttschreuter, 2006; Ter Huurne & Gutteling, 2008).

The overall objective of this chapter was to investigate to what extent extensively used social media applications like Facebook, Twitter, YouTube, Wikipedia, forums and blogs can act as complementary channels to more traditional information channels for consumers to become incidentally or purposefully informed about the risks of pesticide residues. Subsequently, attention was given to the possible motives and barriers for the use of social media applications as an information channel on this issue. A consumer survey was carried out to identify segments of consumers who may benefit from social media being used as an official information channel to distribute information about the risks of pesticide residues on vegetables. Consumer segments were defined based on two main criteria. The first criterion is interest in social media as a channel for information about pesticide residues from official bodies. The second criterion used in the segmentation is information sufficiency as this is one of the main factors determining information seeking. The resulting segments were further evaluated with respect to the participant's general view on social media, individual demographic characteristics and attitudinal variables including self-efficacy and social trust.

## **3.2 Material and methods**

### **3.2.1 Data collection**

Data were collected through an online survey in Flanders, Belgium during March 2012 by means of structured questionnaires. Sample characteristics are presented in Table 3.1. The total sample consisted of 493 participants who were part of a consumer panel linked to the survey tool used. The sample comprised of 58.2% women and 41.8% men. The sample covers a wide range of individuals in terms of socio-demographic characteristics such as education, income, family size and presence of children. The age of the participants ranged from 17 to 85 years, with a mean of 43.2 years (S.D.=15.4 years). The over-representation of higher educated participants is attributed to the use of a web-based data collection method.

Table 3.1: Sample characteristics (% , n = 493)

<i>Gender</i>	
Male	41.8
Female	58.2
<i>Age</i>	
Mean (SD)	43.2 (15.4)
<i>Children in the family (&lt;15 years)</i>	
Yes	22.6
No	77.4
<i>Education level</i>	
Basic level (until 18 years of age)	21.0
Higher education	79.0
<i>Income</i>	
Low	25.3
Medium	34.2
High	40.5

Participants were asked to complete a self-administered structured electronic questionnaire. The questionnaire was developed to measure constructs in relation to (i) the knowledge of and interest in social media as information channel and (ii) self-efficacy and interest in information related to pesticide residues. At the start of the survey, the term 'social media' was explained to participants using the following description: *"Social media is a collective noun for all Internet applications that allow everyone to exchange information online in a user-friendly way. Popular examples of social media applications are YouTube, Twitter, forums, blogs, Wikipedia, and social networking sites like Facebook"*.

### **3.2.2 Segmentation variables**

Information sufficiency is defined as the extent to which the individual feels his/her need for information on a given topic has been satisfied (Eagly & Chaiken, 1993). Information sufficiency was measured with four items on a 7-point interval scale in which participants were asked to indicate their level of satisfaction with their level of knowledge, how sufficient they felt their current knowledge level was, how content they were with the information base they held and whether they felt that they knew enough about the topic to deal with the risks of pesticide residues in their daily lives (Cronbach's  $\alpha=0.93$ ).

To measure interest in information through social media from official sources about the risks of pesticide residues on vegetables, a construct was made based on a variety of the best known social

media applications: forums and blogs, YouTube, Facebook and Twitter. Interest in information through social media was measured on a 7-point interval scale ranging from “1=not interested” to “7=very much interested” and formed a reliable scale of interest in social media as a concept (Cronbach’s  $\alpha=0.71$ ).

### **3.2.3 Segment profiling variables**

#### 3.2.3.1. Perception of social media

Segment profiling variables were selected to identify specific communication opportunities and to formulate strategies to better inform consumers about pesticide residues on vegetables. *Familiarity* with social media was assessed by measuring the use of social media on a 7-point scale ranging from ‘never’ to ‘very much’. Distinction was made between different purposes of social media use including ‘search information’, ‘stay up-to-date’, ‘relaxing/entertainment’, ‘stay in contact with friends’, ‘exchange information with others’, ‘share opinions with others’ and ‘search new friends’ (Mintel, 2011). This resulted in a construct with Cronbach’s  $\alpha = 0.86$ .

According to Griffin, et al. (1999), *channel beliefs* is defined by the perceived usefulness and trustworthiness of a channel. These two factors influence the extent to which a person will seek out information from these channels. The items were measured on a 7-point Likert scale ranging from ‘1=completely disagree’ to ‘7=completely agree’ for the different applications discussed in this study: Wikipedia, YouTube, forums and blogs, Twitter and Facebook (with Cronbach’s  $\alpha = 0.82, 0.84, 0.75, 0.91$  and  $0.84$ , respectively).

Participants were asked to evaluate characteristics of social media in general, using a 7 point Likert scale. Statements (9 positive and 7 negative) are based on the SWOT analysis of social media in Chapter 2. An exploratory factor analysis of these statements resulted in three *motives* for the use of social media as an information channel (i.e. accessibility, possibilities and speed) and three *barriers* for its use (i.e. not trustworthy, competition of traditional media channels and limited knowledge). Items, factors and factor loadings are presented in Table 3.2.



Table 3.2: Perceived motives and barriers to using social media as an information channel

Construct	Factor loading
<b>Motives</b>	
<i>Accessibility (<math>\alpha=0.88</math>)</i>	
Easy accessible	0.858
Low technological knowledge required	0.781
Accessible for everyone	0.824
<i>Speed (<math>\alpha=0.86</math>)</i>	
Fast information transmission allowed	0.793
Up-to-date	0.805
<i>Possibilities (<math>\alpha=0.80</math>)</i>	
Interaction possible between users	0.700
Facilitates placing information online, including photos and videos	0.780
Growing importance because of the fast evolution of mobile technologies	0.625
Possibility to see and follow the interests of friends	0.838
<b>Barriers</b>	
<i>Untrustworthy (<math>\alpha=0.72</math>)</i>	
Anonymity and inability to identify source	0.690
Negative image associated with advertisement, extreme opinions, bullying,...	0.749
An overload of information	0.694
Everybody can post information online, there is no filter	0.734
<i>Competition of traditional media (<math>\alpha=0.82</math>)</i>	
Preference for traditional channels like radio, TV, newspaper as channel	0.924
Preferences for websites of traditional media channels as information channel	0.923
<i>Limited knowledge</i>	
Personal limited knowledge of applications	1.000

### 3.2.3.2 Attitudinal variables

Self-efficacy and social trust were included as attitudinal variables in line with Ter Huurne and Gutteling (2009) who emphasised the effect of these variables on information sufficiency. Self-efficacy can be defined as the trust in oneself to adequately deal with the risk. Self-efficacy was measured by asking whether a person felt able to protect him- or herself from potential risks of pesticide residues. Four items were included: "I am capable of protecting myself from the risks of pesticide residues", "If pesticide residues are present on vegetables, I am capable of dealing with it", "I understand the information and guidelines about pesticides that are spread" and "I know how to handle if I receive information about pesticide residues on vegetables" (Ter Huurne & Gutteling, 2008). These items were measured on a 7-point Likert scale ranging from "1=totally disagree" to "7=totally agree" (Cronbach's  $\alpha=0.82$ ).

Siegrist, Cvetkovich, and Roth (2000, p.354) describe social trust as “the willingness to rely on those who have the responsibility for making decisions and taking actions related to the management of technology, the environment, medicine, or other realms of public health and safety”. Social trust was measured by using four items: “The chemical industry is interested in producing pesticides that are environmentally friendly”, “National authorities take care that pesticides are used in proportion”, “On the whole, pesticides are responsibly dealt with”, and “Scientists working in the chemical industry do not bother about the consequences of their work”. These items were measured on a 7-point Likert scale ranging from “1=totally disagree” to “7=totally agree” (Cronbach’s  $\alpha=0.73$ ).

### **3.2.4 Statistical analysis**

Statistical analyses were done with the software program SPSS 20.0 (SPSS Inc., Chicago, IL, USA). Statistical significance was set at  $p = 0.05$ . Two-step clustering (Wedel & Kamakura, 1998) based on likelihood measures was applied to identify consumer segments. Ward’s hierarchical clustering method was used to identify distinctive homogenous segments based on social media use and information sufficiency. After having identified the optimal number of segments, the clustering was fine-tuned by using the non-hierarchical K-means clustering method (Hair, Black, Babin, Anderson, & Tatham, 2006). Bivariate analyses including cross-tabulation with Chi<sup>2</sup>-statistics, Independent Samples T-test and One-Way ANOVA comparison of means were used to profile the segments in terms of socio-demographics, attitudinal variables and perception of social media.

## **3.3 Results**

### **3.3.1 Segmentation analysis**

Participants’ mean scores on information sufficiency and interest in information via social media applications were used as segmentation variables. A four-segment solution emerged as the optimal solution from the analysis. Table 3.3 summarizes the size of the segments and their mean scores on the segmentation variables. Differences between the four segments are significant on both segmentation variables.

Table 3.3: Mean ratings of the segments on the classification variables

	Segment 1	Segment 2	Segment 3	Segment 4
Number of participants*	24%	28%	25%	23%
Information sufficiency	5.02 <sup>c</sup>	2.31 <sup>a</sup>	2.43 <sup>a</sup>	4.14 <sup>b</sup>
Interest in official information through social media applications	4.37 <sup>c</sup>	4.95 <sup>d</sup>	2.81 <sup>b</sup>	1.33 <sup>a</sup>
	very satisfied; interested	not satisfied; very interested	not satisfied; some interest	satisfied; little interest

The a-d indicate significantly different means. Univariate general linear model with Scheffe post hoc on a 7-point scale (1 = never; 7 = very often) has been applied to assess significant differences and their importance between segments; 95% CI.

\* 19 participants had missing values

Segment 1 accounted for 24% of the sample. People in this segment displayed the highest information sufficiency about pesticide residues and they were interested in information about pesticide residues through social media applications. Therefore, we referred to this segment as '*very satisfied; interested*'. The second segment accounted for 28% of the sample; representing the largest segment. People in this segment had the highest interest in receiving information through social media and a low information sufficiency. We referred to this segment as '*not satisfied; very interested*'. Segment 3 (25%) and 4 (23%) both had a much lower interest in information through social media and had a low and high information sufficiency, respectively. Segment 3 was therefore referred to as '*not satisfied; some interest*' and Segment 4 was referred to as '*satisfied; little interest*'.

### 3.3.2 Differences in segments' perception of social media

Comparison of the general perception of social media applications revealed significant differences between the segments (Table 3.4). The segments were compared on their familiarity with social media, channel beliefs and motives and barriers for social media use as an information channel. Familiarity with social media was significantly different between the segments with a higher interest in using social media, i.e. segment 1 and 2, than those with a lower interest, i.e. segment 3 and 4. Similar differences were observed in the channel beliefs of the different applications included in the survey. Overall, the four segments were found to have the highest belief in Wikipedia and the lowest belief in Facebook and Twitter as information channels.

Table 3.4: Profile of the segments on channel beliefs, motives and barriers of social media use

Social media characteristics	Total sample	Segment 1: very satisfied; interested	Segment 2: not satisfied; very interested	Segment 3: not satisfied; some interest	Segment 4: satisfied; little interest	F-value	p-value
<i>Familiarity with social media</i>	3.64	3.96 <sup>c</sup>	4.05 <sup>c</sup>	3.48 <sup>b</sup>	2.98 <sup>a</sup>	17.096	<0.001
<i>Channel beliefs</i>							
Wikipedia	5.27	5.42 <sup>b</sup>	5.48 <sup>b</sup>	5.19 <sup>a,b</sup>	4.94 <sup>a</sup>	4.771	0.003
YouTube	3.84	4.25 <sup>b</sup>	4.09 <sup>b</sup>	3.51 <sup>a</sup>	3.48 <sup>a</sup>	10.018	<0.001
Forums and blogs	3.83	4.22 <sup>b</sup>	4.06 <sup>b</sup>	3.62 <sup>a</sup>	3.34 <sup>a</sup>	12.784	<0.001
Twitter	3.12	3.56 <sup>b</sup>	3.47 <sup>b</sup>	2.69 <sup>a</sup>	2.67 <sup>a</sup>	15.329	<0.001
Facebook	2.92	3.35 <sup>b</sup>	3.25 <sup>b</sup>	2.40 <sup>a</sup>	2.66 <sup>a</sup>	13.794	<0.001
<i>Motives for social media use as information channel</i>							
Speed	5.45	5.61 <sup>b,c</sup>	5.82 <sup>c</sup>	5.22 <sup>a,b</sup>	5.08 <sup>a</sup>	8.838	<0.001
Accessibility	5.42	5.46 <sup>b,c</sup>	5.86 <sup>c</sup>	5.28 <sup>a,b</sup>	4.97 <sup>a</sup>	9.619	<0.001
Possibilities	4.55	4.79 <sup>b</sup>	4.98 <sup>b</sup>	4.18 <sup>a</sup>	4.16 <sup>a</sup>	14.338	<0.001
<i>Barriers of social media use as information channel</i>							
Not trustworthy	4.58	4.57	4.44	4.66	4.66	1.130	0.336
Competition of traditional media	4.14	4.15	4.05	4.15	4.23	0.235	0.872
Limited knowledge	3.50	3.39	3.30	3.55	3.83	2.306	0.076

The a-c indicate significantly different average scores on seven-point scales using ANOVA and Scheffe post-hoc tests (when equal variances not assumed: Dunnett's C post-hoc test).

The most important motives for using social media as an information channel were speed and accessibility of social media. The segments '*very satisfied; interested*' and '*not satisfied; very interested*' reported stronger motives than the segments '*not satisfied; some interest*' and '*satisfied; little interest*'. The results showed that social media possess some disadvantages as information channel, with lack of trustworthiness as the most important aspect according to this survey. The barriers were similarly evaluated by each segment.

### **3.3.3 Socio-demographic and attitudinal profiling of the segments**

There were relatively more men than women in the '*satisfied; little interest*' segment and more women than men in the '*not satisfied; very interested*' and '*not satisfied; some interest*' segments (Table 3.5). The gender distribution of '*very satisfied; interested*' was very similar to that of the total sample. The '*not satisfied; very interested*' segment was the youngest segment (average age of 40.4 years) and the '*satisfied; little interest*' segment was the oldest (average age of 46.8 years). Education level, self-reported income and the presence of children were not significantly different between the segments.

Table 3.5: Socio-demographic profile of the segments (%)

Socio-demographic profile	Total sample	Segment 1: very satisfied; interested	Segment 2: not satisfied; very interested	Segment 3: not satisfied; some interest	Segment 4: satisfied; little interest	F-value <sup>d</sup> / Chi Square	p- value
<i>Age (average)<sup>c</sup></i>	43.0	42.7 <sup>a,b</sup>	40.4 <sup>a</sup>	42.9 <sup>a,b</sup>	46.8 <sup>b</sup>	3.466	0.016
<i>Gender</i>						8.850	0.031
Male	42.3	43.8	36.4	37.5	53.8		
Female	57.7	56.2	63.6	62.5	46.2		
<i>Children (&lt;15 years)</i>						5.536	0.137
Yes	22.6	22.1	22.7	28.9	15.9		
No	77.4	77.9	77.3	71.1	84.1		
<i>Education level</i>						0.208	0.976
Basic level (until 18 years of age)	21.0	22.1	21.1	21.0	19.6		
Higher education	79.0	77.9	78.9	79.0	80.4		
<i>Income (self-reported)</i>						6.163	0.405
Low	24.8	22.9	24.2	21.9	20.2		
Medium	34.0	30.3	40.0	37.1	28.9		
High	41.1	46.8	35.8	41.0	50.9		
<i>Attitudinal variable<sup>c</sup></i>							
Self-efficacy	3.95	4.83 <sup>b</sup>	3.30 <sup>a</sup>	3.44 <sup>a</sup>	4.42 <sup>b</sup>	45.043	<0.001
Social trust	3.85	4.14 <sup>b</sup>	3.72 <sup>a</sup>	3.69 <sup>a</sup>	3.90 <sup>a,b</sup>	6.902	<0.001

The a-b indicate significantly different average scores on seven-point scales using ANOVA and Scheffe post-hoc tests (when equal variances not assumed: Dunnett's C post-hoc test).

<sup>c</sup>: F-value for the "age (average)" and attitudinal variables, Chi-square for other tests.

As reported in Table 3.5, self-efficacy and social trust played an important role in profiling the segments. A very clear distinction could be observed between the two segments with a higher information sufficiency, i.e. the *'very satisfied; interested'* and *'satisfied; little interest'* segments, and the groups with lower information sufficiency, i.e. the *"not satisfied; very interested"* and *"not satisfied; some interest"* segments. The latter groups reported the lowest level of trust in themselves, but also in authorities responsible for food safety.

### **3.4 Discussion**

The present chapter offers insight about the possible use of social media applications as channels to inform consumers about the risks of pesticide residues on vegetables. With a large and constantly increasing share of users, social media has the promise of becoming a new way to reach consumers with risk information about pesticide residues in food. It is worthwhile to reflect on how consumers might be exposed to this information, i.e. by purposefully seeking or by incidentally encountering, as different dynamics take place. Based on information sufficiency, it could be argued that both possibilities can occur and should be taken into account by authorities such as governments or food safety agencies when informing the public.

The growing importance of social media in everyday life has fuelled the potential impact and reach of interpersonal information sources which play an important role in incidental information acquisition: "Instead of telling a few friends, consumers now have the ability to tell hundreds or thousands of other people with a few keystrokes" (Mangold & Faulds, 2009, p. 359). The nature of many social media applications is such that friends, family, and peers can dominate one's online social network, thereby giving the information provided by these individuals increased exposure relative to official authorities who may not be included in one's online social network. To more effectively disseminate information about pesticide residues that could be picked up by social networks, it is advised to provide information that is on the one hand user-friendly to spread and on the other hand interesting enough to be shared through social networks. Rhoades and Ellis (2010) also recognized that besides content credibility, viewer interest was a major factor for the success of YouTube videos about food safety.

Consideration needs to be given as to how best to target information to those consumers who engage in information seeking. Our results indicate that information seeking could be triggered by a lack of trust in oneself and in the responsible agencies to adequately deal with the risks of pesticide residues on vegetables. Gender also plays a role as women reported a lower information sufficiency than men. As stated before, search engines are a key component for information seeking. While

reliable and useful information about pesticide residues from official bodies is available online (Winer, 2009), consumers searching for it might not be able to retrieve it because search engines favour other websites. Social media applications could provide some opportunities as they are generally seen as search engine friendly due to activities like tagging (i.e. the linking of content to key words) and extensive use of hyperlinks (Xiang & Gretzel, 2010). Hochstotter and Lewandowski (2009) showed that the community-driven websites Wikipedia, YouTube and Yahoo! Answers were the most popular domains in Google for 500 different search queries.

However, it is still questionable whether popular social media applications like Facebook and Twitter can provide added value as an extra channel to distribute information about pesticide residues and related risks to consumers. Although these channels are accessible and free information sources, our results show that even among the interested consumer segments, Facebook and Twitter were not perceived as the most ideal information channels. This might also explain the mixed success in previous attempts to use social media as an official communication channel (Thackeray, et al., 2012). The work by Thackeray and colleagues showed that public health departments are using social media as a channel to simply distribute information rather than to capitalize on the interactivity available to create conversations and engage with the audience. A study that examined the everyday information seeking behaviour of young adults corroborates this outcome and found that applications such as Facebook, and blogs, were seen as serving the purpose of communication or interaction with friends rather than for news or information gathering (Williamson, et al., 2012). While accessibility and the quantity of information has become massively enhanced by the Internet, the quality and trustworthiness of information presents a bigger challenge. This was confirmed by our results where trustworthiness was the main barrier for using social media as an information channel.

In contrast with Facebook and Twitter, Wikipedia was seen as an interesting information channel. Even among participants who had a low interest in information through social media, Wikipedia had a good reputation. Although Wikipedia is an open-access online encyclopaedia that anyone can edit, perceived trust and usefulness scored high in the current chapter. As Wikipedia is also frequently at the top of search engine results (Laurent & Vickers, 2009), food safety authorities and risk communicators are recommended to recognise this source of information and use its potential to inform and guide information seekers in relation to information about pesticide residues and possibilities of reducing possible risks of pesticide intake.

Some limitations of the study need to be taken into account when interpreting the results and its contributions. Firstly, whereas information sufficiency is an important predictor of information



seeking, it is not the only factor that has an influence. Other determinants like risk perception, affective response and involvement can also influence information seeking behaviour (Kuttschreuter, 2006). Future research should seek to extend the work of the current study to consider what the investigation of these factors may add to the current findings. Secondly, the web-based data collection used in this study may have led to an overrepresentation of highly educated participants as consumers from different socio-economic backgrounds may have differential access to the Internet.

### **3.5 Conclusion**

A rising concern against the risks of pesticide residues exists among consumers and this has not been matched with the development of appropriate, effective and efficient applications for the delivery of information about pesticide residues. The Internet has a determining role in information seeking and incidental information acquisition so it is essential to understand how it can be implemented in an optimal way. The current chapter supports the premise that social media applications present communicators with new and powerful ways to reach both interested and uninterested consumers but it is no guarantee for success. Although some of the participants had reservations which mainly linked to unfamiliarity, more than half revealed an interest in obtaining information from official bodies about pesticide residues and related risks through social media. As an information channel, Wikipedia scored highest amongst the social media applications surveyed.





# Chapter 4

## Seeking information about food related risks: The contribution of social media

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This chapter is based on:

Kuttschreuter, M., Rutsaert, P., Hilverda, F., Regan, A., Barnett, J., Verbeke, W. Seeking information about food related risks: The contribution of social media. *Under review.*

### **Abstract**

In the current information landscape, there are numerous channels for consumers to find information on issues pertaining to food safety. The rise in popularity of social media makes communicators question the extent to which resources should be allocated to these channels in order to reach new segments or audiences which are hard to reach through common dissemination channels. A segmentation approach was used to identify groups of consumers based on their inclination to use different channels to seek information about food-related risks, including traditional media, online media and social media. In the wake of the EHEC crisis, the study focused on a bacterial contamination of fresh vegetables. Results were obtained through an online survey with 1264 participants from eight European countries in September 2012. Four segments were identified with respectively 'a high cross-channel inclination' (24%), 'an established channel inclination' (31%), 'a moderate cross-channel inclination' (26%) and 'a low cross-channel inclination' (19%). Results show that social media can act as a complementary information channel for a particular segment, but is not seen as a substitute for traditional or online media. Individuals who showed an inclination to use social media in conjunction with other channels displayed an elevated level of affective response and information need about food-related risks. The 'high cross-channel inclination' segment contained relatively younger and more Southern European participants.

*RQ6: Which role can social media play besides more common information channels for consumers who seek information about food related risks?*

*RQ7: What specific needs and perception towards food or which specific socio-demographic profile can be expected from consumers who are interested in social media?*

## 4.1 Introduction

The 2011 E.coli contamination of fenugreek seeds in Europe and the 2011 listeriosis outbreak in contaminated cantaloupes in the United States generated a lot of public attention and concern regarding the consequences that can result from a food contamination incident, with both cases resulting in many illnesses and deaths (Laksanalamai, et al., 2012; Mellmann, et al., 2011). Other incidents such as the contamination of processed beef products with horsemeat in 2013, although not posing a particular public health risk, attracted much media attention, and evoked questions and concerns among the general public (Verbeke, 2013). Typically when a food safety incident occurs, there is often increased anxiety and information seeking activity among consumers (Kuttschreuter, 2006). To develop effective communication strategies, it is crucial to understand the processes through which consumers encounter and search for information from different sources, as well as through different channels.

Many studies have highlighted the importance of information sources in food risk communication (Frewer, et al., 1996; European Commission, 2010; Kornelis, de Jonge, Frewer, & Dagevos, 2007; Van Kleef, et al., 2006). Consumers' intention to use communication channels on the other hand has garnered less attention in food risk literature (Clarke & McComas, 2012; Frewer et al., 2013). This chapter aims to fill this gap by investigating consumers' intention to use current prevalent online and offline information channels. Special attention is given to the opportunities that arise with regards to the current societal popularity of several social media applications. The growth of social media offers communicators new channels for improving the communication of food risks but must be considered alongside the classical media channels that are traditionally used (Barnett et al., 2011). In other words, how do consumers that are familiar with social media applications evaluate these as a channel to seek information about food risks, compared to other more traditional channels?

### 4.1.1 *Channel use in a complex media landscape*

When seeking information about food safety, the public has the opportunity to access information through many different channels. Traditional media such as television, radio and newspaper have been recognized as a key source and channel of food risk information and have had a profound influence on consumer perception of food-related risk (Houghton et al., 2008). The media is one of the arenas where risk messages are constructed, disseminated and transformed. Therefore, communicators have mainly used these channels to spread their message in the past (Noar, 2006). Traditional media also have been held responsible for being a potential amplification station of risks (Petts, et al. 2001). As food risks are the focus of considerable public concern, they are likely to be a

topic of much media reporting. While experts may believe the media to be an outlet which only serves to create public anxiety, consumers generally view this commodity in a positive light and see the media as a valuable channel of risk-related information about food (Krystallis, et al., 2007; Van Kleef et al., 2006).

In recent decades, the communication landscape underwent a number of substantial changes with huge implications for organisations and institutions with a remit in food communication. The Internet has become a key channel for consumers to seek food risk information (Jacob, et al., 2010; Redmond & Griffith, 2006; Tian & Robinson, 2008). Search engines have become the main starting point for accessing a vast amount of information online (Brossard & Scheufele, 2013; Kobayashi & Takeda, 2000). By entering a specific set of search terms in the search engine, users can find relevant information about a diversity of topics, including food safety issues. Another option to obtain food risk information is to directly access the website of a particular trusted organisation. Also news websites are increasingly playing a role as a key online information channel (De Waal, Schönbach, & Lauf, 2005).

In the last decennium the Internet has seen a new array of technical innovations that go collectively under the name of 'web 2.0'. Web 2.0 has provided a platform for the evolution of social media which is defined as "a group of Internet-based applications that build on the ideological and technological foundations of web 2.0, and that allow the creation and exchange of user generated content" (Kaplan & Haenlein, 2010, p.61). Consumer engagement on different social media platforms is growing exponentially. Applications like Facebook, YouTube and Twitter are extremely popular and used by millions of people every day. The high current societal popularity of social media introduces the question if consumers also would be inclined to seek food safety information through social media channels (Barnett, et al., 2011; Brossard & Scheufele, 2013; Rutsaert, Pieniak, et al., 2013). Tools such as YouTube make it easy for organisations to share videos, which can be used by viewers on websites, blogs or other social media applications. Social networking sites such as Facebook and micro-blogs such as Twitter have built-in search engines that allow one to seek information within their online community. Forums and blogs allow the individual to express personal views, share information and engage in citizen journalism (Tilley & Cokley, 2008).

#### ***4.1.2 Determinants of channel choices for seeking information about food risks***

The need for additional information and the consequent behaviours have been explored within the Risk Information Seeking and Processing (RISP) model; a model which was designed to account for predictors of information seeking and processing within the context of risk (Griffin, et al., 1999;

Griffin, et al., 2004). Information provision to consumers should be properly managed and targeted to address particular needs as not all consumers are alike: *“Individual characteristics such as uncertainty level, involvement, knowledge, or personality, as well as attitudes, lifestyles and socio-demographics account for differences in information needs and reactions to information”* (Verbeke, 2005b, p.352). Kuttischreuter (2006) defined three main determinants that could directly influence an individual’s level of information seeking about food risks: risk perception, information need and affective response. Whether these determinants also result in different patterns of channel use has, to our knowledge, not been investigated.

One of the main determinants of information seeking according to the RISP framework is the information need of a consumer (Kahlor, et al., 2003; Ter Huurne & Gutteling, 2008). Information need can be defined as the gap between information that is held and information that is desired. This information need has been found to be more predictive of information seeking than the actual level of knowledge held by an individual (Griffin, et al., 1999). The media complementarity framework, introduced by Dutta-Bergman (2004), proposes that interested consumers will employ various media in a complementary fashion. This framework suggests that level of interest in a particular topic is one of the main drivers to determine media usage. Where the displacement theory (McCombs, 1972) predicts that a new media channel will replace a previously employed media channel (for example the Internet replacing the newspaper), the complementarity framework suggests that media will be used in a complementary fashion. In other words: if the topic is of interest to an individual, (s)he will use all different channels available to inform himself about this topic. With respect to our study, this would mean that individuals might be interested in using social media information channels as a complement to other channels.

People’s judgements of risks and their need for additional information is also influenced by affective response (Slovic, et al., 2004). Affective response to a risk, such as worry, can influence one’s judgment of the amount of information needed to cope with the risk according to Griffin et al. (1999). Results of Kornelis, et al. (2007) confirmed this outcome as these authors found that consumers who are more worried about food-related risks are more inclined to consult food-safety information sources. Their results also highlighted that consumers who relied more heavily on their social network as a source of information displayed the highest level of worry. These results indicate that stronger affective response might result first of all in an increased preference for information seeking through numerous channels. Secondly, increased affective response might lead to a higher preference for social media as a source of information as friends, family and peers are central to many social media applications.

In addition to understanding consumer tendency to use particular channels, it is also important to consider that socio-demographic characteristics such as age, gender and income can be significant for tailored information provision (Kornelis, et al., 2007). Research has shown for example that older people and males have much lower trust in online health information channels than younger people and females (Hesse, et al., 2005). The country in which consumers are residing may also be a key determinant of channel preferences as the traditional and social media landscape is not homogenous across Europe (de Almeida, et al., 1997; European Commission, 2010).

### **4.1.3 Purpose of the chapter**

The primary objective of this chapter is to identify how consumers familiar with social media position it as a channel to seek information about food risks, alongside more traditional online and offline channels. Insights obtained from this chapter are relevant to discuss whether there is added value for communicators in investing resources in social media as a channel to retrieve information and whether social media allow communicators target consumers who are difficult to reach through more *traditional* channels? We aim to segment consumers based on their intended channel use when seeking additional information on food-related risks. The second objective is to gain a better understanding of the profiles of those consumers that are inclined to use social media as a channel to seek information about food risks. Which is the motivational, perceptual and socio-demographic profile of consumers who are inclined to use social media? This goal will be achieved by comparing attitude towards food, information need, affective response and the socio-demographics between the different segments.

In order to provide a context to situate these questions, safety risks related to bacteria in fresh vegetables were taken as the topic of the study in the wake of the EHEC crisis. The E-coli contamination of fenugreek seeds led to the death of 50 people, serious kidney failure of 850 others and severe economic losses that not only affected Germany, but also other European countries. Several vegetables such as cucumbers, lettuce and tomatoes, were erroneously mentioned as carriers before fenugreek seeds were identified as the culprit. The uncertainty regarding the carrier food was associated with a large drop in sales of the suspected vegetables.

## **4.2 Material and methods**

### **4.2.1 Participants and design**

A cross-national survey was carried out with a representative sample of approximately 200 consumers from 8 European countries: the Netherlands, Belgium, Ireland, United Kingdom, Italy,



Germany, Spain and Portugal ( $n = 1622$ ). The sample was stratified according to gender and country. Exclusion criteria were individuals aged beneath 18 and 75 or above. Data collection took place in September and October, 2012. Participants in all countries were recruited by the same market research agency and invited to fill out an online questionnaire, which took them approximately 30 minutes.

For this particular study, we were interested in the participants who were familiar with all channels selected for information seeking. Therefore, 358 participants (22.1%) were excluded from the analysis, due to their unfamiliarity with social media. The sample characteristics of the 1264 participants included in the study are presented in Table 4.1. Gender distribution was approximately equal across countries. Participants' mean age was 42.8 years. Almost half of the participants indicated that they were coping on their present income.

Table 4.1: Sample characteristics (% , n = 1,264)

<i>Age (years)</i>	
<30	20.6
30-39	24.5
40-49	21.8
50-59	16.3
>60	16.8
Mean (SD)	42.8 (14.6)
<i>Gender</i>	
Male	50.5
Female	49.5
<i>Financial situation (self-reported)</i>	
Living very comfortably	4.8
Living comfortably	21.1
Coping on present income	46.0
Finding it difficult	20.3
Finding it very difficult	7.8
<i>Country</i>	
Belgium (n=155)	12.3
Germany (n=149)	11.8
Ireland (n=154)	12.2
Italy (n=171)	13.5
Portugal (n=166)	13.1
Spain (n=158)	12.5
The Netherlands (n=149)	11.8
United Kingdom (n=162)	12.8

#### 4.2.2 Segmentation variable

*Perceived likelihood of channel use for information seeking:* Participants were asked to indicate how likely they would be to use a number of communication channels to find additional information about vegetable risks (7-point Likert scale, ranging from 'very unlikely' to 'very likely'). Participants were presented with different online and offline information channels (Table 4.2). Special attention was given to a social media that have emerged through the evolution of web 2.0 such as the use of micro blogs, forums, blogs, social networking sites and YouTube for additional information seeking about food-related risks.

Table 4.2: Factor loadings from principal component analysis for inclination to use channels for information seeking about risks of fresh vegetables (n=1,264)

	Factor 1 social media	Factor 2 traditional media	Factor 3 online media
Use micro-blogs such as Twitter	0.876		
Read or write online blogs	0.859		
Read or take part in forums or chat groups online	0.804		
Use social networking sites such as Facebook, MySpace, LinkedIn, Google+	0.795		
Watch videos online e.g. on YouTube	0.710		
Listen to the radio		0.884	
Watch television		0.881	
Read the newspaper		0.838	
Read online articles on news websites			0.792
Use a search engine such as Google			0.742
Directly access website of a food communication agency			0.665
Variance explained (%)	30.76	25.83	13.86
Cronbach's $\alpha$ internal reliability	0.88	0.88	0.72

An exploratory factor analysis that used the principal components extraction method with varimax rotation on these 11 items revealed three factors as follows: social media (5 items, Cronbach's  $\alpha = 0.88$ ), traditional media (3 items, Cronbach's  $\alpha = 0.88$ ) and online information (3 items, Cronbach's  $\alpha = 0.72$ ). The factors explained more than 70% of the variance in the original data. The internal reliability coefficient or Cronbach's alpha for each dimension was satisfactory, and constructs were computed as the average of corresponding items.

#### 4.2.3 Segment profiling variables

The segment profiling variables are selected based on the determinants for information seeking proposed by Kuttschreuter (2006) and informed by the RISP model (Griffin, et al., 1999). All measures were extensively tested for reliability.

Consumer attitudes in relation to information were evaluated with three constructs: Information dependency, wanting additional information about risks of fresh vegetables and self-efficacy to find information. The three constructs were measured using a 7-point Likert scale ranging from '1 = completely disagree' to '7 = completely agree'. *Information dependency* included four items: 'Being well informed is very important to me', 'It is very important to me to be up-to-date', 'I feel

uncomfortable when I am uninformed' and 'I like to know as much as possible about topics that interest me' (Cronbach's  $\alpha = 0.88$ ). *Information need about risks of fresh vegetables* consisted of three items: 'I want to learn more about the potential consequences of eating a fresh vegetable that carries residues of chemicals used in farming', 'I would like to know more about how to reduce the risks of eating fresh vegetables' and 'I would like to find out more about the risks of eating a fresh vegetable that carries a virus or bacteria' (Cronbach's  $\alpha = 0.94$ ). *Self-efficacy to find information* was measured by three items: 'If I want to find out something on risks of specific eating habits, I know how to find it', 'If I want to find out about the benefits of a particular food, I know where to look for it' and 'If I have a question about how to compose a healthy meal and cook it safely, I know who to address' (Cronbach's  $\alpha = 0.91$ ).

Two determinants were included to measure affective response. *General risk sensitivity* was measured on a seven point Likert scale based on three items: 'If something bad happens to someone else, I think it is likely to happen to me', 'I regularly think about negative events that might happen to me in the future' and 'I am inclined to worry about something bad happening to me' (Cronbach's  $\alpha = 0.84$ ). *Future facing risk perception* was measured with three items on a 7-point interval scale where the participants were asked how likely they think that five persons will die within the next five years as a result of: 'An incident involving improper treatment of fresh vegetables during production or transportation', 'Fresh vegetables that are carrying a virus or bacteria' and 'Fresh vegetables that are carrying a chemical such as pesticides or fertilizer' (Cronbach's  $\alpha = 0.87$ ).

General attitude and consumption of fresh vegetables were also measured. These variables were included to check if the variance between the segments could be explained by information need rather than by general attitude and consumption behaviour. *General attitude towards fresh vegetables* was measured using 7-point semantic differential scales. Participants were presented with the statement, "Please indicate which word best describes your feeling toward fresh vegetables" The bipolar adjectives were bad/good, unsatisfied/satisfied, unpleasant/pleasant, and negative/positive. This scale is a commonly used scale for assessing general attitude (Stayman & Batra, 1991; Pieniak, et al., 2010). The construct "general attitude towards fresh vegetables" is the average across the four items (Cronbach's  $\alpha = 0.96$ ).

*Consumption of fresh vegetables* was a self-reported item and it was measured as total fresh vegetable consumption frequency per week. A 8-point frequency scale ranging from "never" to "seven times or more per week" was used. These variables were recoded into frequencies per week (e.g. "never" became 0; "once a week" became 1; and "seven times or more per week" became 7).

*Socio-demographic variables:* Gender, age and country of residence were recorded. Financial situation was assessed by asking participants to indicate how comfortable they were living on their present income (five response categories ranging from very comfortable to finding it very hard).

#### **4.2.4 Analysis**

Statistical analyses were carried out with SPSS 20.0 (SPSS Inc., Chicago, IL, USA). First, factor analysis using principal components was performed to discover the basic structure underlying the intention to use channels for information seeking about food risks (findings already presented in Table 4.2). Second, two-step clustering (Wedel & Kamakura, 1998) based on likelihood measures was applied to identify consumer segments. Ward's hierarchical clustering method was used to identify distinctive homogenous segments based on the perceived usefulness of information channels. After having identified the optimal number of segments, the clustering was fine-tuned by using the non-hierarchical K-means clustering method (Hair, et al., 2006). Bivariate analyses including cross-tabulation with Chi<sup>2</sup>-statistics and Kruskal–Wallis one-way analysis of variance were used to profile the segments.

### **4.3 Empirical results**

#### **4.3.1 Cluster analysis**

Hierarchical clustering was performed with the three constructs resulting from the exploratory factor analysis as segmentation variables: traditional media, online media and social media. Inspection of the agglomeration schedule and dendrogram allowed us to decide that a four cluster solution would be optimal. Next, a K-means cluster analysis using Ward's method was performed with initial cluster centres resulting from the hierarchical procedure. The respective size and mean scores of the segments are reported in Table 4.3.

Table 4.3: Mean scores of the segments on inclination to use channels for information seeking about risks of fresh vegetables

	Total	Segment 1	Segment 2	Segment 3	Segment 4	p-value
Number of participants	1264	300 24%	390 31%	328 26%	246 19%	
Information seeking on social media	3.27	5.16 <sup>d</sup>	2.37 <sup>b</sup>	3.94 <sup>c</sup>	1.50 <sup>a</sup>	<0.001
Information seeking on traditional media	5.12	6.07 <sup>b</sup>	5.96 <sup>b</sup>	4.16 <sup>a</sup>	3.90 <sup>a</sup>	<0.001
Information seeking on online media	5.23	6.22 <sup>d</sup>	5.91 <sup>c</sup>	4.58 <sup>b</sup>	3.82 <sup>a</sup>	<0.001
Interpretation of segments		High cross-channel inclination	Established media inclination	Moderate cross- channel inclination	Low cross-channel inclination	

The a-d indicate significantly different average scores on seven-point scales between the segments using independent sample Kruskal-Wallis tests.

The participants in segment 1 were characterised by a high intention to use all available channels to seek additional information about the risks of fresh vegetables. For this reason, we labelled this segment as '*High cross-channel inclination*'. Further in the text, this segment will be referred to as the '*High*' segment. Approximately 24% of the participants were classified in this segment.

Participants in segment 2 were labelled as '*Established media inclination*' (or the '*Established*' segment). Compared to participants of the '*High*' segment who showed a tendency to seek additional information through all available channels, participants of this segment considered especially the more established channels such as online and traditional media as channels to seek additional information about risks of fresh vegetables. Social media was not seen as a potential channel to seek information by this segment. This was the largest segment with 31% of the participants.

Segment 3 contained participants with a moderate tendency to use the presented channels to seek additional information. It should be noted that while traditional and online media scored below average compared to the total sample, social media as information channel scored above average. This segment contains 26% of the participants and is labelled as '*Moderate cross-channel inclination*' and referred to as the '*Moderate*' segment.

Segment 4 represents the smallest segment with approximately 19% of the participants. The '*Low cross-channel inclination*' segment (or '*Low*' segment) revealed a low inclination to seek additional information about vegetable risks, regardless of the information channel.

### **4.3.2 Profiling of the clusters**

The four identified segments were compared in relation to information need, affective response and attitude towards fresh vegetables (Table 4.4). Significant differences were found between the segments in relation to constructs linked to the need for information. The highest need for information, both in general and about risks of fresh vegetables in particular, was present in the '*High*' segment. The second level was found in the '*Established*' segment and the lowest need for information was presented both in the '*Moderate*' and '*Low*' segment. A higher information need associated with a higher inclination to use multiple channels. Self-efficacy to find information followed a similar pattern as information need. Yet in this case, both the '*High*' and '*Established*' segment displayed an equal level of self-efficacy. Overall, segments reported a positive information need and self-efficacy to find that information.

Table 4.4 Profile of consumer segments on dimensions of information need, affective response, consumption and attitude towards fresh vegetables.

	Total Sample	Segments				p-value
		High cross-channel inclination	Established media inclination	Moderate cross-channel inclination	Low cross-channel inclination	
Information dependency	5.34	5.99 <sup>c</sup>	5.68 <sup>b</sup>	4.82 <sup>a</sup>	4.69 <sup>a</sup>	<0.001
Information need about risks of fresh vegetables	5.12	5.82 <sup>c</sup>	5.47 <sup>b</sup>	4.64 <sup>a</sup>	4.36 <sup>a</sup>	<0.001
Self-efficacy to find information	5.31	5.66 <sup>c</sup>	5.58 <sup>c</sup>	4.84 <sup>a</sup>	5.10 <sup>b</sup>	<0.001
General risk sensitivity	4.03	4.52 <sup>c</sup>	3.87 <sup>a,b</sup>	4.05 <sup>b</sup>	3.65 <sup>a</sup>	<0.001
Future facing risk perception	4.01	4.35 <sup>b</sup>	3.92 <sup>a</sup>	3.92 <sup>a</sup>	3.84 <sup>a</sup>	<0.001
Consumption of fresh vegetables (times per week)	3.18	3.84 <sup>c</sup>	3.25 <sup>b</sup>	2.93 <sup>a,b</sup>	2.62 <sup>a</sup>	<0.001
Attitude towards fresh vegetables	6.01	6.06 <sup>a,b</sup>	6.18 <sup>b</sup>	5.84 <sup>a</sup>	5.92 <sup>a,b</sup>	<0.001

The a-c indicate significantly different average scores on seven-point scales between the segments using independent sample Kruskal-Wallis tests.



### **4.3.3 Socio-demographic profile of segments**

Table 4.5 presents the socio-demographic characteristics of the segments. With regard to age, large differences were found between the segments. The average age of the *'Established'* and *'Low'* segments was significantly higher than the average age of the *'High'* and *'Moderate'* segments. The latter segments were overrepresented in the youngest two age categories, and strongly underrepresented in the oldest age categories.

Furthermore, results indicated that the segments differed significantly with respect to the country in which the segment members were living. In the segment characterised by a high cross-channel inclination, Portugal and Spain were overrepresented. Italy was also overrepresented in this segment and additionally so in the *'Moderate'* segment, which is also characterized by an above average inclination to use social media. In the *'Low cross-channel inclination'* segment, Belgium, The Netherlands and the United Kingdom were overrepresented. In these countries, and in Germany, the *'High cross-channel inclination'* segment was noticeably underrepresented.

There were no significant differences found with respect to gender and self-reported financial situation of the participants.

Table 4.5: Socio-demographic profile of the segments (n=1,264)

Socio-demographic profile	Total Sample	Segments				p-value
		High cross-channel inclination	Established media inclination	Moderate cross-channel inclination	Low cross-channel inclination	
<i>Age (years, average)<sup>c</sup></i>	42.8	40.1 <sup>a</sup>	45.7 <sup>b</sup>	39.0 <sup>a</sup>	46.7 <sup>b</sup>	<0.001
<i>Age (% category)</i>						<0.001
<30	20.6	25.3	12.6	29.6	15.4	
30-39	24.5	28.7	22.1	28.7	17.9	
40-49	21.8	22.0	25.6	17.1	22.0	
50-59	16.3	11.3	20.8	11.3	22.0	
>60	16.8	12.7	19.0	13.4	22.8	
<i>Gender (%)</i>						0.753
Male	50.5	49.0	49.2	51.5	52.8	
Female	49.6	51.0	50.8	48.5	47.2	
<i>Financial situation (%)</i>						0.416
Living very comfortably	4.8	5.3	2.8	4.3	8.1	
Living comfortably	21.1	19.7	23.1	20.1	21.1	
Coping on present income	46.0	44.3	46.9	47.9	43.9	
Finding it difficult	20.3	22.0	19.7	20.4	18.7	
Finding it very difficult	7.8	8.7	7.4	7.3	8.1	
<i>Country (%)</i>						<0.001
Belgium	12.3	5.3	12.8	12.5	19.5	
Germany	11.8	6.3	13.1	13.1	14.6	

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Ireland	12.2	14.7	12.3	11.3	10.2
Italy	13.5	17.3	10.8	18.0	7.3
Portugal	13.1	24.7	14.9	8.2	2.8
Spain	12.5	19.3	12.1	12.2	5.3
The Netherlands	11.8	3.7	11.0	14.0	19.9
United Kingdom	12.8	8.7	13.1	10.7	20.3

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#### 4.4 Discussion and conclusion

The goal of this chapter was to assess how consumers evaluate social media as a channel to seek additional information about food-related risks. As food plays a main role in everyday life, providing accurate and timely information about possible risks has been key to protect consumers, avoid social amplification, avoid major economic losses in particular sectors of the food chain, and to re-establish consumer confidence (EFSA, 2012). Nowadays, there is an increasing abundance of channels available for the public to use when looking for food-related information. Therefore, communicators should be aware of where consumers are looking for information and why these specific channels are used. The popularity of social media to connect with friends and family or as a source for entertainment has been generally acknowledged (Intel reports, 2011) but are people also inclined to use social media as a channel to find additional information on food risks? Which role can social media play besides more common information channels such as traditional and online media and should communicators reallocate their attention to social media?

The results clearly show that social media can act as a complementary channel for at least a section of consumers to seek information about food risks, but not as a substitute. Segmentation analysis indicated that those participants that were positively inclined towards using social media as a channel to seek additional information about food risks did so using it as part of a broader configuration of channel use. A high intention to use traditional and online media was also present. Social media might be used to confirm information that was found on other channels or vice versa. Given that social media provides individuals the opportunity to reflect personal opinions or experiences, it allows to use social media applications as social proof and monitor how peers deal with comparable situations (Bunce, Partridge & Davis, 2012). It may prove worthwhile to pursue social media as an additional channel to confirm an official message also sent out through more traditional media. Previous work has indicated that conflicting information which is communicated across different channels can lead to lower perceived credibility of an official risk message (Regan, et al., under review). Any opportunity to increase awareness of consistent messages across multiple channels is valuable to ensure consumers feel confident in the risk information they receive.

A second segment of consumers displayed a lower but equally spread intention to use traditional, online and social media and the two remaining segments had a very low inclination to use social media for food and risk-related information. Based on the results of this segmentation study, social media might not be useful to target consumers who are difficult to reach through more established channels in terms of information seeking about food-related risks (Barnett, et al., 2011). If consumers

indicated a low inclination to seek information on traditional or online media, this was also the case for social media. The results also showed that low information seekers portrayed a relatively lower consumption of fresh vegetables. Therefore, a main reason for a low inclination to seek additional information seeking could be linked to a lower level consumer involvement and consumption of fresh vegetables (Verbeke, 2005a).

The determinants that led to additional information seeking about food-related risks have been thoroughly investigated based on the RISP model. In this study, these determinants have been used to gain better understanding of why people are inclined to use particular information channels. Information need had an influence on intended channel use as it led to a higher intention to use multiple channels. These results are fully in line with the media complementarity framework of Dutta-Bergman (2004) and were also reported by Tian and Robinson (2008). In their study on health information seeking, interpersonal channels, mass media channels and the Internet were used as complementary channels by interested consumers. These results suggest that depending on the message one wants to communicate, all different media and sources of information might be utilized by interested consumers, including social media. Whereas the information need was higher for the *'High'* segment than for the *'Established'* segment, self-efficacy to find information was equal. Participants belonging to the *'Established'* channel were apparently convinced that the information they needed was sufficiently available through traditional and online media and no need was detected to start using social media in addition.

The results of Kornelis et al. (2007) indicated that emotional reactions to food risks lead to a higher use of information sources and especially sources within their own social network such as friends, acquaintances and family. The empirical results of our study corroborate these findings and showed that affective response was significantly higher in the *'High cross-channel inclination'* segment than in the other segments. The *'Moderate'* segment also displayed a higher level of affective response than expected (i.e. equal to the *'Established'* segment which scored higher on information need). These results might indicate that social media grows in importance as an information channel among consumers who display a higher level of affective response.

The differences in mean age between the segments who see potential in social media and the ones that do not, are in line with characteristics of the early adopters of new technologies (Rogers, 1995) and the common (younger) profile of social media users (European Commission, 2012). Older people are less likely to be early adopters of new technologies such as social media and revealed preferences for more established media. Young Internet users in Europe are growing up with social

media which makes these tools very familiar to them and thus, they may be more likely to see its value as an information channel. Besides age, there were also large country differences between the segments. Where the southern countries (Spain, Portugal and Italy) were overrepresented in the segments with an inclination to use social media to seek information, the more northern countries (Belgium, Germany, The Netherlands and United Kingdom) were overrepresented in the segments with a low inclination to seek additional information, regardless of the considered channel. These countries had a very low likelihood of using social media as an information channel.

The Internet and especially the evolution of the web 2.0 technology has made dissemination and production of information faster and easier than ever before. Organisations are increasingly using social media to target specific audiences and present information that is relevant to them. However, the findings of this study suggest that this does not mean that these new channels will automatically replace more conventional channels for consumers to seek information about food risks. A large part of the participants were not at all familiar or revealed intention to use social media applications. However for the younger group of consumers, with an increased level of affective response and information need about food-related risks, social media could act as a complementary information channel.



# Chapter 5

## Moving beyond information seeking: Deliberating on food risks and benefits

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This chapter is based on:

Rutsaert, P., Gaspar, R., Marcu, A., Barnett, J., Pieniak, Z., Seibt, B., Lima, L., Fletcher, D., Verbeke, W.  
Moving beyond information seeking: Deliberating on food-related risks and benefits. (*Under review*)

### **Abstract**

Successfully engaging consumers in a dialogue may provide opportunities for more effective communication about food-related risks and benefits. Using the VIZZATA™ online software, this study explored the validity of a behavioural measure of deliberation in an online environment in the context of consumers' perceptions of, and online information seeking about the risks and benefits of red meat. Participants from Belgium, Portugal and the United Kingdom (n=150) were presented with bite-sized pieces of content about risks and benefits related to red meat and they were given the opportunity to engage in on-going asynchronous interaction about the given information with a team of scientists. Online deliberation was operationalized as a personal or individual metric based on four activities: the number of questions asked in relation to online available material, the number of comments left, the number of glossary terms accessed, and the time spent on viewing the material. This operationalization provided a coherent measure of deliberation and was positively correlated with information recall. Participants who perceived the information as too complex preferred to avoid information about food-related risks and benefits instead of possibly feeling incompetent to deal with the information.

*RQ 8: Can deliberative engagement be assessed as a behavioural measure and how is this measure composed?*

*RQ 9: What is the effect of online deliberation on information recall?*

*RQ 10: Which factors influence deliberative activity of consumers?*



## 5.1 Introduction

Deliberation between authorities and the public has mostly been seen as a way to develop better informed authorities and provide contributions for policy development. Consumers on the other hand are also influenced by deliberative activity as participation in the communication process can support individuals to become more informed about an issue (Demont, et al., 2013; Min, 2007; Ramsey & Wilson, 2009). In the field of food risk and benefit communication, bridging the divides between scientific experts and the lay audience has usually been a difficult task (Gaskell, et al., 2004; Hansen, et al., 2003). Furthermore, although risk communication has been extensively addressed over the last 30 years, much less attention has been paid to developing strategies of communicating balanced information and to understanding how consumers respond to situations in which both risk and benefit information are available (Cope, et al., 2010; van Dijk, Fischer, & Frewer, 2011; Verbeke, et al., 2008). Most food products have both positive and negative aspects which consumers often have to weigh up and trade off. Therefore, communicators have the challenging task to assist consumers in making informed decisions (EFSA, 2012) and provide clear information about the balance between risks and benefits, which should build trust and therefore attenuate risk perceptions (Qin & Brown, 2006; van Dijk, van Kleef, Owen, & Frewer, 2012).

Therefore, it is important to explore how consumers weigh up the various positive and negative aspects of a given food, and how they engage in seeking clarification about these aspects as they make sense of them. Furthermore, given the ubiquitous use of the online environment for communicating risks and benefits to consumers, it is important to understand how consumers interact with information material presented and which aspects of it they pay most attention to. Thus, the goal of this study was to acquire a better understanding of the nature of consumer deliberation in an online environment. Hereafter deliberation in an online environment will be referred to as “online deliberation”. With the aid of a new online deliberation tool, VIZZATA™, the first objective of this study aims to test the validity of a behavioural measure of online deliberation which was operationalized in terms of four indicators: the number of questions asked by consumers about the online stimulus material, the number of comments left by consumers, the number of glossary terms accessed, and the time spent reading the online stimulus material. To validate the construct, information recall will be used as a control measure. The second objective was to conceptualise and validate a model defining the predictors of online deliberative activity related to balanced information about red meat.

The idea that food-related communication should be clear and easy to understand is accepted best practice (McGloin, et al., 2009). However, scientific results and risk assessments cannot always be easily translated into simple guidelines and advice that the lay public or the media can easily understand (Barnett, et al., 2011). The simultaneous communication of food risks and benefits can result in complex messages and increase confusion and uncertainty. For example, an analysis of fish communication (in traditional media channels like newspapers and television) over the last 15 years in the United States by Greiner et al. (2010) has shown that the food news messages are relatively complex, sometimes contradictory, and that messages have changed over time. Message complexity can have a significant effect on information processing. In complex situations (or rather, in situations perceived as complex) individuals might fall back on heuristic strategies by attending to the characteristics of a message such as source credibility instead of actually engaging with the message content (Kahneman & Tversky, 1979). We might envisage situations where people choose not to seek information, particularly when information is likely to lead to a reassessment of one's opinions, practices, or to challenge the status quo (e.g. Shepherd & Kay, 2012). Cognitive dissonance theory (Festinger, 1957) postulates that inconsistent cognitions, such as contradictory beliefs, attitudes, or behaviours, elicit an aversive state of psychological arousal, the state of dissonance, which in turn produces a desire to reduce the underlying inconsistency and to maintain a state of consonance. Although cognitive dissonance principles have been applied in a variety of fields, the implications of cognitive dissonance theory for risk communication has not been properly explored (e.g., Meertens & Lion, 2011). Some researchers have suggested that information avoidance (particularly, negative information) enables the use of uncertainty or of ambiguity as a tool (Bradac, 2001; Case, Andrews, Johnson, & Allard, 2005), e.g. to deny that one is at risk. The risk information seeking and processing model (RISP) accepts that some people might avoid risk information if it leads to worries they cannot cope with (Griffin, et al., 1999).

However, it is also important to study information sufficiency. Whereas studies around consumer deliberation mostly focus on collective activities, deliberation itself is essentially an individual action. When individuals are sufficiently motivated to engage with the information presented to them, they are likely to deliberate (Borah, 2011). The heuristic-systematic model proposed by Chaiken (Chaiken, 1980; Eagly & Chaiken, 1993) stipulates that information can be processed systematically, heuristically or by a combination of these two. Where the heuristic mode involves the use of simple decision rules or rules of thumb to process information, the systematic mode is based on a detailed processing of all useful information to reach judgement. From this perspective, deliberation is a form of active information seeking and processing, and is arguably underpinned by systematic rather than

heuristic processing as it involves deeper thought and analysis. Building on the heuristic-systematic model, the RISP model (Griffin, et al., 1999) starts from the idea that not all individuals need the same amount of information. By developing the concept of 'information sufficiency', Griffin, et al. (1999) stipulate that information seeking is strongly based on the discrepancy between the actual level of knowledge and the desired level of knowledge, or information to be able to deal adequately with a given risk. The larger the gap between the actual and desired level of information, the more effortful information seeking and processing will take place as people think they do not know enough about the given risk. Therefore, information sufficiency is a relevant concept to study as a possible driver of deliberation.

Another possible predictor of deliberation is personal relevance, as an issue perceived to be personally relevant is more likely to generate systematic information processing efforts (Chaiken, 1980; Griffin, et al., 1999). Involved participants will focus more on the content of a message and look beyond heuristic cues like source characteristics (Chaiken, 1980; Verbeke, et al., 2008). In relation to everyday food risks and benefits, food is commonly perceived as a typical low-involvement product, therefore one might expect limited interest in information and consequently a low level of deliberation. Nevertheless, consumer involvement with food may differ depending on the person, the situation and the product at hand. For example, following consecutive meat safety crises in Europe at the end of the nineties, a campaign was set up to inform consumers in Belgium about traceability, labelling and the safety of meat in Europe. With only 304 calls for a free information leaflet (opposed to the target of 15.000), the campaign was considered a failure. Verbeke, Ward, and Avermaete (2002) attributed this to the fact that this campaign was executed a year after the dioxin crisis and that consumer involvement had become too low as the risk had passed. This results are in line with the 'rationally ignorant consumer' hypothesis of McCluskey and Swinnen (2004) which states that the opportunity cost of processing information may be too high compared with the smaller benefits from the additional information.

Based on the theories of information avoidance and risk information seeking and processing, we examined the following constructs as predictors of deliberation: perceived information complexity, risk and benefit information sufficiency, and personal relevance.

## **5.2 Material and methods**

In the present study we adopted the online deliberation tool VIZZATA™ (<http://www.vizzata.com>) (Barnett, et al., 2008). This tool allows researchers to present the target audience with bite-sized

pieces of content (be they text, images, videos, website screenshots, etc.) and to elicit the audience’s questions and comments in relation to these pieces of content. The participants can indicate their preference to receive responses from the research team, prior to moving to a second phase where their questions and comments are answered and further questions, comments and answers can be elicited. VIZZATA™ thus offers the opportunity for on-going asynchronous interaction between the communicator or researcher and the audience (Figure 5.1). A further feature of VIZZATA™ is the inclusion of ‘glossary terms’ – highlighted words in the online text which can be clicked on to provide further information. One of the core features of VIZZATA™ resides in eliciting questions and comments from the participants and observing their engagement with the study material, for example by measuring the time spent on each of the content testers (online pages with pieces of information) or the number of glossary terms that the participants access.

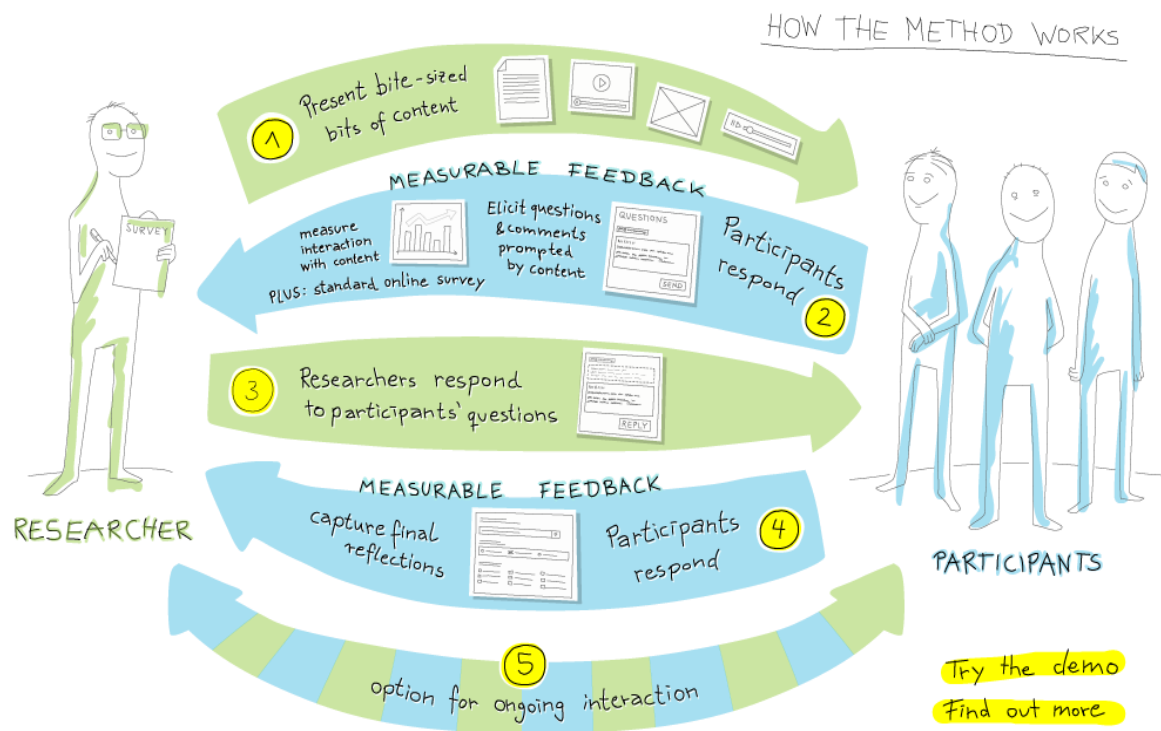


Figure 5.1: Brief overview of the VIZZATA™ method

Participants were invited to the website and presented with each of the seven content testers where they could ask questions or make comments. First, the participants completed a short series of closed response questions, which included measures of the predictors of deliberation and other control measures. They were then presented with the seven content testers. Five of these pages contained highlighted glossary terms. At the bottom of each page, participants had the opportunity to leave questions or comments on the material presented. The first phase of the study finished with the participants completing a further series of measures pertaining to information seeking and processing. After the research team conducted the necessary study work to provide responses to the questions and comments participants had submitted, the responses were emailed back to the participants. Approximately two weeks after completion of the first phase, they were invited to the second phase of the study and asked to complete a final set of questions. Between both phases, no incidents with regards to the study topic (red meat) occurred in the participating countries.

### **5.2.1 Context of the study**

Red meat was chosen as the topic of the study. As for the food products that have been characterised by a mixture of positive and negative health effects, fatty fish, with the trade-off between omega-3 fatty acids and fat-soluble toxins, has received extensive attention as a case-study (Foran, et al., 2005; Levenson & Axelrad, 2006; Pieniak, et al., 2007; Verbeke, Sioen, Pieniak, Van Camp, & De Henauw, 2005). Yet less attention has been paid to red meat, the topic of this study, which is also worthy of attention as it has increasingly been associated with both risks (e.g. residues as well as cardiovascular disease and , colorectal cancer risk) (Hill, 2002; McAfee, et al., 2010; Smolinska & Paluszkievicz, 2010) and benefits (e.g. as a source of high-value protein and essential minerals like iron, zinc and vitamin B12) (Higgs, 2000; McAfee, et al., 2010; Wyness, et al., 2011). Furthermore, red meat risks and benefits pertain not only to the arena of human health and nutrition but also to socio-cultural practices (Audebert, Deiss, & Rousset, 2006; McAfee, et al., 2010) and environmental impact (Aston, Smith, & Powles, 2012; Dawson, et al., 2011).

Table 5.1 presents an overview of the topics covered in the study . The information on the content testers and the list of glossary terms are provided respectively in Appendix II and III. All the content tester pages were about red meat and potential risks and benefits linked to it. The first content tester page gave a general introduction to red meat. The next two pages dealt with health and non-health risks of red meat. Pages four and five provided information about the health and non-health benefits of red meat, respectively. On page six, a recent article from the BBC News Online was presented (BBC, 2012) (in Belgium and Portugal, translations of the article were used which appeared

in quality newspapers). The article discussed the increased risk of early death in relation to excessive consumption of red meat based on a recent US study (Pan, et al., 2012). The last content tester contained a YouTube video about synthetic or in vitro meat (YouTube, 2011) developed by the Royal Institution of Australia. We wanted to cover all the different aspects in which the red meat issue is discussed in society, not only based on information provided by communicators but also through the media channels. In addition, synthetic meat was selected as another possible complex topic that had recently emerged and is expected to develop further in the upcoming years, with regard to red meat. The last two content testers (red meat in the news and the YouTube video) did not contain clickable glossary terms. To avoid bias because of order effects (Verbeke, et al., 2008), half of the participants were presented with the risk pages first and half with the benefit pages first. As no significant differences were found in the further analysis between the two groups, the sample was treated as one.

Table 5.1: The title and topics of the content testers (information pages)

<b>Content tester</b>	<b>Title</b>	<b>Topics</b>
1	Introducing red meat	Definition of red meat General meat consumption Red meat and the food pyramid
2	Possible risks of eating red meat	Cardiovascular disease risk Colon cancer risk Preferment of lean meat
3	Other downsides to red meat	Environment Greenhouse Gas Emission Deforestation
4	Benefits of eating red meat	Nutrients and vitamins Providing satiety Red meat and growth in children
5	Other values to red meat	Cultural identity Taste Contribution to ecosystem
6	Red meat in the news	BBC article with title: "Red meat increases death, cancer and heart risk, says study"
7	Synthetic meat	YouTube video about synthetic meat

### **5.2.2 Participants**

A total of 244 participants were recruited through a market research agency to take part in the study (80 from the UK; 80 from Belgium and 84 from Portugal). The participants were selected in order to

have a sample meeting particular study inclusion criteria (e.g. non-vegetarian, consuming red meat at least once a week) and with a wide range of socio-demographic characteristics (e.g. diversity in occupational backgrounds, participants with and without children). Of these, 150 (62%) completed both phases of the study in the summer of 2012. There was an equal division of men and women in the sample. 22.7% of the sample was younger than 30, 42% were aged between 30 and 40 and 35.3% were older than 40 years. 45.3% of the sample reported that they had children. The majority of the sample had completed college education (53.3%). With regard to their financial situation during the last twelve months, on a scale from 1 to 7 (where 1 meant "I am very well off" and 7 "I have difficulties in paying the bills"), the mean value in the sample was close to the mid-point ( $M = 3.81$ ;  $SD = 1.51$ ).

### **5.2.3 Measures**

This study aimed to measure how users engaged in deliberative activity, which has been operationalized as a latent construct of the standardized scores of four components: (i) the number of questions participants asked, (ii) the number of comments they left, (iii) the number of glossary terms they accessed and (iv) the time they spent on the exercise. Asking questions indicates information seeking and is considered a useful way to assess uncertainties in participants' understanding of information (Dillon, 1982). The ability to comment gave participants the opportunity to express personal views concerning the given information. The glossary terms in the text provide the user with active control to access additional information he or she desired. The total time spent on the exercise indicates a level of interest in the presented material. Important to note is that standardized scores were calculated which means that the deliberation measure for a participant is a relative measure that takes into consideration the comparison to the other study participants.

*Information recall* was measured in the second phase of the study where the participants returned to fill in a final short survey. One of the questions was related to recall of the presented information. The participants were asked to name up to three risks and three benefits of eating red meat they could remember from reading the material presented in the first phase. The measure of recall was calculated as the sum of risk and benefit information correctly recalled and thus ranged from zero to six.

Information sufficiency about the risks and benefits of red meat, information complexity and personal relevance were measured as self-reported variables. *Information sufficiency* was defined as

the extent to which the individual feels his/her need for information on a given topic had been satisfied (Eagly & Chaiken, 1993). Information sufficiency regarding both the risks and benefits of red meat was measured on a 7-point Likert scale ranging from 'completely disagree' to 'completely agree'. *Perceived complexity* of information was measured on a 7-point Likert scale based on the study of Shepherd and Kay (2012). *Personal relevance* was also measured on a 7-point Likert scale using four items as presented in Table 3.

#### **5.2.4 Data analysis**

Data were analysed using the statistical software SPSS version 20.0 and LISREL 8.72. First, a maximum likelihood confirmatory factor analysis was performed using the robust maximum likelihood procedure in LISREL 8.72. Second, structural equations model parameters were estimated and the general fit of the model was assessed. With the use of structural equation modelling (SEM), the examination of all the relationships between constructs and items was performed simultaneously, which is a substantial advantage compared with single equation modelling (Bollen, 1989). To evaluate how closely the data fit the hypothesized model, the following goodness of fit indices are reported: the  $\chi^2$ -value together with degrees of freedom (df), the ratio ( $\chi^2$  /df), the Root Mean Square Error of Approximation (RMSEA), the non-normed fit index (NNFI), and the Comparative Fit Index (CFI). Values below 0.08 for RMSEA (Browne & Cudeck, 1993) and above 0.90 for NNFI and CFI (Hu & Bentler, 1999); and  $\chi^2$  /df <2 (Tabachnick & Fidell, 2007) indicate an acceptable fit of the model. Due to the fact that  $\chi^2$  is very susceptible to sample size and the number of items, it is recommended selecting the ratio of the  $\chi^2$  /df as an alternative criterion (Hair, et al., 2006; Tabachnick & Fidell, 2007).

### **5.3 Results**

#### **5.3.1 Descriptives statistics**

Table 5.2 presents the profiles of deliberative activity of the participants. Of the 150 participants who completed the study, 72% engaged in deliberative activity by asking questions, giving comments or clicking on glossary terms. Belgium had the lowest number of participants who engaged with the information while the UK had the highest number. In total, the participants asked 138 questions, left 279 comments and accessed the 20 glossary terms 435 times. No significant differences were found between countries. Although the analysis of the questions and comments is beyond the scope of this paper, examples of questions and comments are provided in appendix 1. Information recall was



generally low, while significantly higher for the benefits ( $M = 1.82$ ;  $SD = 1.06$ ) than for the risks of red meat ( $M = 1.57$ ;  $SD = 1.05$ ;  $t(149) = -3.92$ ;  $p < .001$ ).

Table 5.2: The number of questions, comments, clicks on glossary terms and average time spend in the three countries

	Total	BE	PT	UK
Number of valid participants	150	55	50	45
Deliberative activity (%)	72.0	61.8	72.0	82.2
Number of questions asked	138	51	39	48
Number of comments left	279	101	71	107
Glossary term clicks	435	151	128	156
Average time spend (seconds)	979	954	894	1103

### 5.3.2 Confirmatory factor analysis

Confirmatory factor analysis was performed to determine whether measures of a construct actually converged towards the intended latent variable of deliberation or shared a high proportion of variance in common, and whether the constructs were distinct from each other. Latent variables, items, loadings and reliability estimates are presented in Table 5.3.

Table 5.3: Latent variables, items, factor loadings and reliability estimates

<b>Measures</b>	
<i>Deliberation</i>	(0.73)
Asking questions	0.63
Giving comments	0.71
Clicking glossary terms	0.55
Total time spent	0.79
<i>Personal relevance</i>	(0.80)
It is important to me to include red meat in what I eat in a typical week	0.79
It is valuable to me to include red meat in my diet	0.96
It is not important to me to eat red meat on a regular basis	0.49
Eating red meat is important to my well-being	0.75
<i>Information sufficiency about risks</i>	(0.74)
I know many of the negative aspects of eating red meat	0.84
I am confident I know enough about the risks of eating red meat	0.88
I am not satisfied with my knowledge about the risks of red meat for human health	0.70
<i>Information sufficiency about benefits</i>	(0.83)
I know many of the positive aspects of eating red meat	0.64
I am confident I know enough about the benefits of eating red meat	0.85
I am not satisfied with my knowledge about the benefits of red meat for human health	0.64
<i>Perceived complexity of the information</i>	(0.78)
The various benefits and risks of eating red meat were difficult to grasp	0.86
I found myself struggling to understand the information on red meat	0.93
The risks and benefits of red meat consumption seemed incredibly technical and complex	0.63
The sheer number of things to take into consideration when deciding how much red meat I should eat was overwhelming	0.50

Internal construct/composite reliabilities are reported in parentheses; All factor loadings are significant at  $p < 0.001$ . Fit-statistics:  $\chi^2(120) = 157.53$ ,  $p = 0.012$ ; RMSEA = 0.044; NNFI = 0.97; CFI = 0.98.

Due to low factor loadings ( $< 0.40$ ) six items in total were deleted. The individual item loadings on the constructs were all significant with values ranging from 0.49 to 0.96. No cross loadings of 0.4 or more appeared. One factor loading reported relatively low value (0.49 for the item *It is valuable to me to include red meat in my diet*). However, due to acceptable values of Cronbach's alpha coefficients for the personal relevance construct (0.80) and the important meaning of the item within the construct we decided to retain it in further analyses.

All Cronbach's alpha internal reliability coefficients were above the threshold value of 0.7 for satisfactory scales (Hair et al., 2006). Descriptive statistics of the five constructs, factor loadings and reliability estimates are presented in Table 5.4.

Table 5.4: Correlation matrix of constructs of interest

Construct	1	2	3	4	5
1. Deliberation*	1.00				
2. Personal relevance	0.19*	1.00			
3. Information sufficiency about benefits	0.01	0.42*	1.00		
4. Information sufficiency about risks	-0.06	0.06	0.72*	1.00	
5. Perceived complexity of the information	-0.41*	-0.14	-0.13	-0.15	1.00

\* correlations are statistically significant at  $p < 0.05$  (two-tailed).

### 5.3.3 Deliberation and information recall

Information recall was calculated as a validation of our behavioural measure. Based on the relative deliberation scores the participants were divided in three tertiles, i.e. low, medium and high deliberators. Figure 5.2 indicates that the number of risks and benefits about red meat recalled in the second stage of the study increased as the relative level of deliberation increased. High deliberators ( $M = 4.32$ ;  $SD = 1.72$ ) recalled significantly more risks and benefits than low ( $M = 2.74$ ;  $SD = 1.85$ ;  $t(98) = -4.42$ ,  $p < .001$ ) and medium deliberators ( $M = 3.22$ ;  $SD = 1.84$ ;  $t(98) = -3.09$ ,  $p < .01$ ).

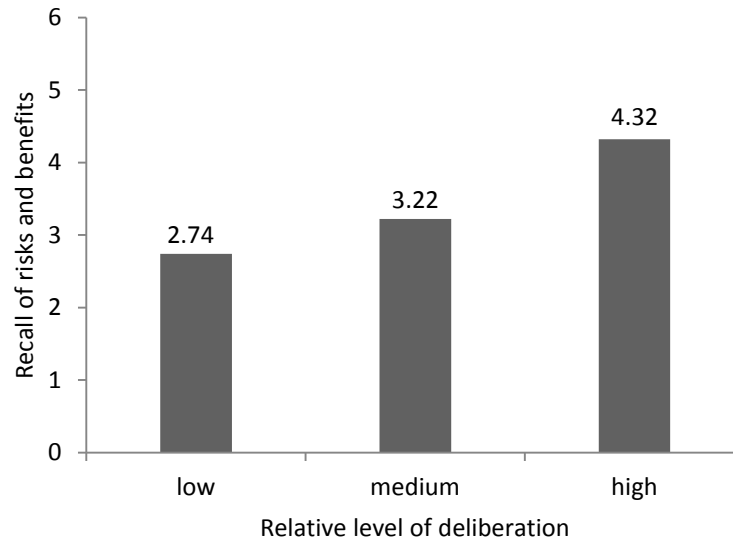


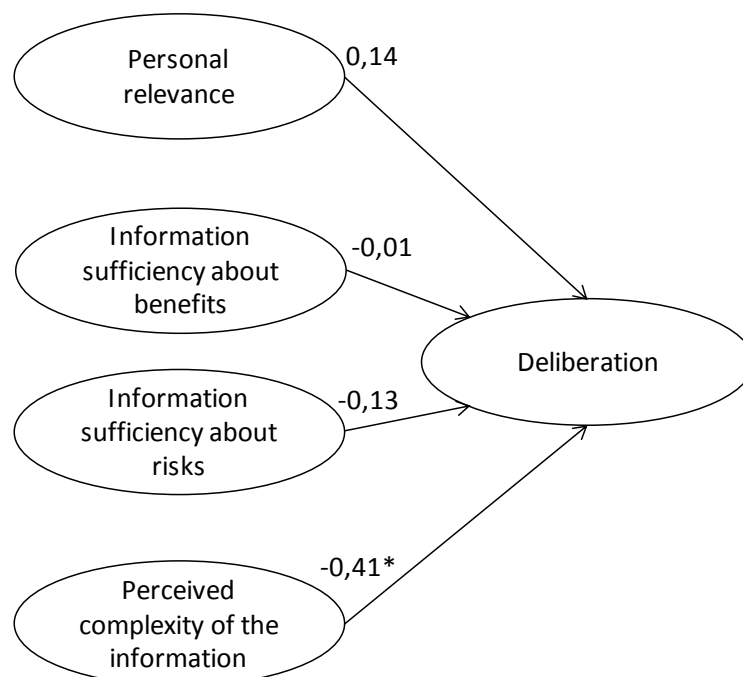
Figure 5.2: Information recall of relatively low, medium and high deliberators

### 5.3.4 Model validation

The hypothesised model performed well (Figure 5.2). The  $\chi^2$  for the model was 202.18 with 125 degrees of freedom ( $p < 0.001$ ), and ratio of 1.6 thus in accordance with the recommended threshold

level. The RMSEA value was 0.064; the NNFI was 0.95 and the CFI was 0.94, indicating that the goodness-of-fit indices were satisfactory.

*Perceived complexity* of the information was negatively moderately (-0.41) and directly associated with our measure of deliberation. Thus, the lower the perceived complexity of the information, the greater the deliberation. Direct relationships between personal relevance, information sufficiency about risks, information sufficiency about benefits and deliberation had been included in the model but failed to reach statistical significance. The findings thus support only one of the four theorized determinants of deliberation.



\*  $p < 0.01$

Figure 5.3: Path modelling results of predictors of deliberation

#### 5.4 Discussion and conclusion

The goal of this study was to validate a behavioural measure of online deliberation in the context of consumers' perceptions of the risks and benefits of red meat and related online information seeking. We conceptualized and operationalized deliberation as an activity resulting from other activities: asking questions, leaving comments, accessing glossary terms, and spending time on the study stimulus material. The results indicate that deliberative activity can be assessed as an individual and behavioural measure and that it varies among individuals. Difference between more or less active participants can and do occur in collective activities (i.e. the occurrence of relatively inactive

participants in focus groups (Schneider, Kerwin, Frechtling, & Vivari, 2002) but the possible impact of this receives little attention. Using the VIZZATA<sup>TM</sup> online deliberation tool, we identified a number of actions undertaken by individuals that allowed us to construct a personal or individual metric of deliberation.

The four items in the construct of deliberation highlight different facets of deliberative activity. Asking questions is an activity that is indicative of thought and consideration about the presented information. It shows how people are seeking to make sense of new information (Marcu, et al., under review). It can also be considered as an indicator of attentiveness (Ripberger, 2011). Comments are a way for people to express a personal view on a topic and provide feedback to the communicator. Like the activity of asking questions, giving comments also requires engagement with and consideration of the material at hand. The ability to provide feedback is a form of social interactivity and facilitates mutual relationships (Jiang, Chan, Tan, & Chua, 2010). Allowing consumers to select the information they want to access - in this instance by clicking onto glossary terms - is a form of mechanical interactivity. Active control gives participants the freedom to choose which material they want to engage with (Boczkowski & Mitchelstein, 2012). There were no time constraints on the study which gave the participants the possibility to choose how much of their time they wanted to spend on the study. Hence, time spent was also considered a component of deliberative activity.

Having constructed a coherent measure of online deliberative activity it was also possible to corroborate this using a measure of information recall. Thus we see a systematic relationship between behavioural indicators of attentiveness to and engagement with the risk and benefit information and the material that was retained and subsequently reproduced. That is not to say that recall is a primary or necessarily desirable outcome of deliberation but as part of this early attempt to develop online methods that facilitate deliberation it serves as a useful construct against which to locate the deliberation measure. Were there to have been no relationship between the behavioural measures and recall it would have brought our operationalization of deliberation into question.

The second major objective of this study was to assess what might predict deliberation such as information sufficiency, personal relevance, and perceived information complexity. By using structural equation modelling, we were able to estimate the strength of direct relationships between the different constructs on one hand and deliberation on the other hand. Our first assumption was that personal relevance would have a positive influence on deliberation as in the case of information seeking (Chaiken, 1980), i.e. the more personally relevant red meat was, the more the participants

were expected to engage in commenting, questioning, and accessing glossary terms. The concept of personal relevance has also been linked with involvement in the context of fresh meat consumption (Verbeke & Vackier, 2004). Although there was a correlation between personal relevance and deliberation, this construct had no significant impact in the model. A possible explanation is that consumers who attach a high personal relevance to red meat, i.e. are more involved with red meat consumption, may have had higher information avoidance. Based on the cognitive dissonance theory, this is expected to occur when individuals anticipate that risk information will conflict with their previous cognitions, for example, with their personal opinions or attitudes towards red meat. This has been related to food risks (Kuttschreuter, 2006). Risk information avoidance refers to an individual's tendency of not wanting to know information on particular risks. From a policy perspective, this finding indicates that simply making risk information available might not be sufficient to promote knowledge in individuals who tend to avoid risk information while they might gain most from exposure (Gaspar, et al., under review).

Information sufficiency about the risks and benefits of red meat was also expected to have a negative influence on deliberation. While the RISP model of Griffin, et al. (1999) is largely based on these factors, and we started from the premise that consumer deliberation could be seen as a form of information seeking, our results did not support the RISP model. In contrast, perceived information complexity was the only significant predictor with a significant negative effect on deliberation. While one might have assumed that difficulties in understanding the information may have resulted in people leaving more questions and comments or accessing more the glossary terms, the opposite was found and the greatest deliberation with the presented information was observed among people with low perceived information complexity. Sun, Fang and Lim (2012) studied the effect of task complexity on motivation and argue that when people are able to complete a more complex task, this could lead to satisfaction of the need for competence. On the other hand is perceived task complexity negatively related with the probability to complete a task and unsuccessful fulfilment of a task can lead to a sense of incompetence. Participants who perceived the information as too complex might therefore prefer to avoid this instead of feeling incompetent to deal with information.

This study operationalized online deliberation in terms of the number of questions asked in relation to online available study material, the number of comments left, the number of glossary terms accessed, and the time spent on viewing information material related to red meat benefits and risks. This operationalization provided a coherent measure of deliberation that can be used in future studies monitoring online deliberation processes in other settings and contexts.









# Chapter 6

## General discussion and conclusion

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Previous chapters have discussed the findings from each of the individual studies in this thesis, along with study-specific conclusions. *Chapter 6* aims to integrate the findings from these individual studies to draw some general discussions and conclusions. This chapter is sub-divided into four sections. The first section provides a recapitulation of the dissertation's structure and indicates how this structure relates to the conceptual framework, to the research objectives and the research questions. The second section provides a general discussion of the main research findings of the thesis and sets forth policy recommendations. The third section discusses the contribution of this thesis and the final section acknowledges the limitations of this doctoral research and proposes opportunities for further research.

### **6.1 The research objectives, propositions and hypotheses revisited**

The overall objective of this dissertation was to gain a better understanding of the value of social media in food risk and benefit communication and provide evidence-based recommendations for stakeholders charged with an official remit for food communication. Based on the conceptual framework presented in Chapter 1, four specific research objectives and ten research questions were set forth which encompassed insights from both consumers and communicators (Figure 6.1). To explore the four different sections of the conceptual framework, we performed qualitative in-depth interviews (Study 1), a national and a pan-European web-based consumer survey (Study 2 and 3) and an online experimental study (Study 4).

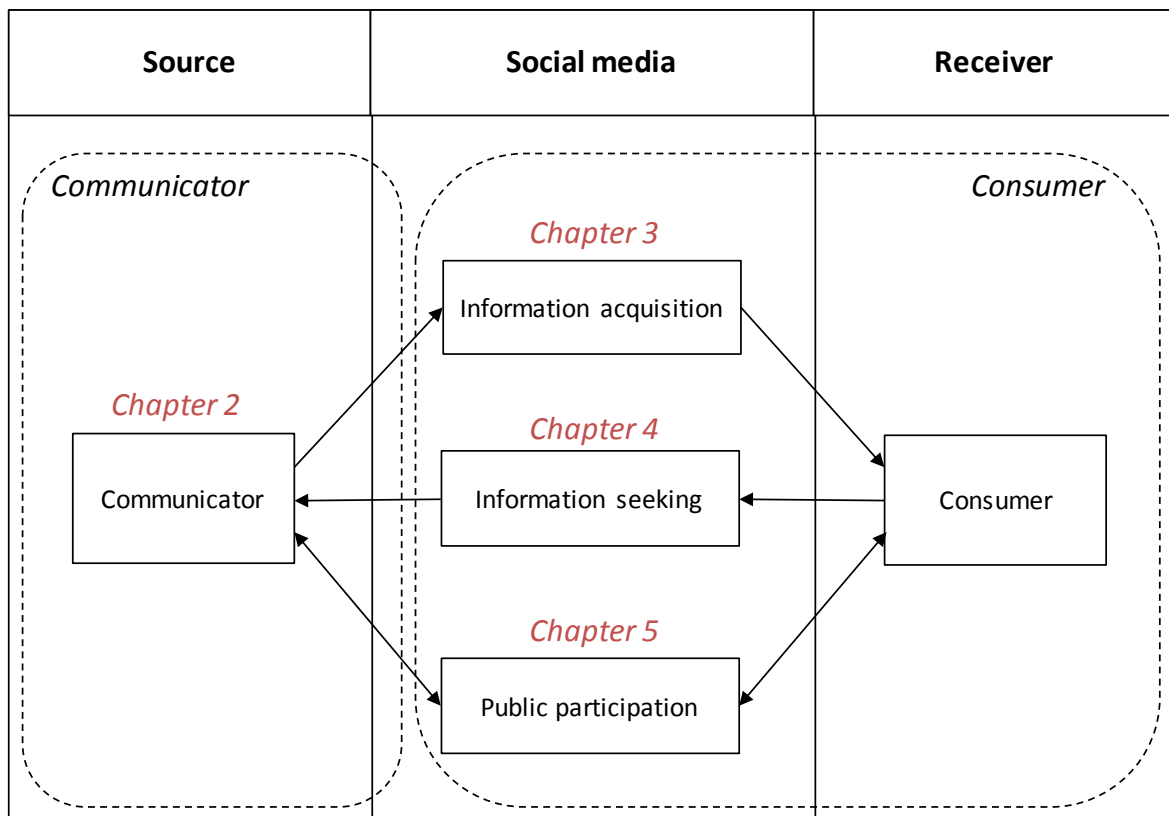


Figure 6.1: Thesis outline in relation to the research framework

### **6.1.1 Explore communicator perspectives about the use of social media for food risk and benefit communication**

The first objective was to assess the perspectives of sources in the food domain, i.e. stakeholders and experts, on the potential use of social media for food risk and/or benefit communication. The results reported in Chapter 2 were based on in-depth interviews (January 2011) and a follow-up electronic questionnaire (October 2011) with respectively 38 and 10 stakeholders and 33 and 13 experts from six European countries: Belgium, Ireland, Italy, Latvia, Spain and The Netherlands. The cross-cultural dimension of this study adds weight as the nature of online information signifies that food risk communication activities are no longer confined within national borders. A SWOT analysis carried out as part of the in-depth interviews enabled the investigation of the perceived usefulness of social media in food risk and benefit communication and future possibilities and emerging threats. The results of the SOR-analysis in the email questionnaire was used to translate the statements in the SWOT analysis into more practical strategic objectives. The applied methods used in the first chapter/study offer valuable insights into these emerging and innovative platforms which may prove both useful and essential as part of future food risk and benefit communication strategies.

1. *which role social media can play besides more common information channels for consumers who seek information about food related risks*

The SWOT analysis explored what the strengths, weaknesses, opportunities and threats are of using social media to improve food risk and benefit communication, while the SOR defined strategic objectives for future use. Although the current use of social media by our participants was rather limited, the results reveal a growing interest in these platforms as well as a desire for a better understanding of the changes social media introduces in current best practices in communication. A comparison of the internal strengths and weaknesses with the external opportunities and threats indicated that social media has promising strengths to grasp relevant opportunities in food risk and benefit communication. This is referred to as the attack strategy and this strategy was suggested by the scores obtained by experts as well as stakeholders.

A comparison of the communicators' prioritized strategy with the different levels of public engagement set out in the framework, allows for the alignment of the communicators view with our proposed framework in Chapter 1. Three levels of consumer engagement are included in the framework: incidental information acquisition, purposeful information seeking and public participation. The first level is incidental information acquisition and refers to information discovery via an individual monitoring of his/her environment. This level of engagement requires the lowest level of consumer engagement; nevertheless it occupies an important role in everyday information seeking. The increase in the amount of time people are spending on social media has also increased its role as an incidental information source. This is recognized by communicators. The high accessibility and peer-to-peer awareness on social networks creates an atmosphere where information can be easily forwarded and shared within online communities. Also in times of crisis, when fast information transmission and wide reach is needed, social media provides a highly relevant alternative to more traditional media channels.

The second level of consumer engagement in our proposed framework is information seeking. In the current media landscape, there are numerous channels that consumers may use to find additional information. To develop effective communication strategies, it is crucial to understand where consumers search for information and whether social media would provide opportunities on this matter. Communicators indicated the need for unbiased information as an opportunity that could be enhanced by social media. The SOR scores however indicate that two weaknesses of social media prevent the communicator from benefiting from this opportunity: low trust in the source and the lack of filters online. Sources on social media can be anonymous and unidentifiable which lowers

trust in social media as an information channel. Secondly, everybody (including experts, companies, consumers and pressure groups) is able to post information online through social media and therefore can become an accessible source of information. Although information can be accessed easier than ever before, the massive generation of information also carries a cost for the consumer: “having too many choices is equally likely to cause delays in finding needed information than is having too few” (Lu & Yuan, 2011, p.134). Information overload can lead to time loss in terms of time spent looking for the necessary information, as well as boredom or impatience (Salaün & Flores, 2001).

Dialogue between the communicator and consumer is the third level of consumer engagement. At the core of social media exists the potential for a communication process which is representative of one of the key principles of risk/benefit communication: the formation of an interactive and participatory two-way stream of dialogue (Covello & Sandman, 2001). Communicators acknowledge this and rate the strength of interaction as one of the strongest elements to benefit from the existing opportunities. Engagement can transform the public and stakeholders from passive recipients of information, to more active players in the process, which is necessary to avoid damaging side effects of risk communications or over-reactions to perceived hazards (Shepherd, 2008; Verbeke, 2011).

Also engagement and interaction through social media between scientists can improve food safety and communication. During the early summer 2011 outbreak of the EHEC crisis in Germany, social media proved useful in determining the genetic make-up of the organism which had been a previously unknown strain. A Chinese laboratory led the investigation to identify the culprit strain. Online forums developed by researchers and by the World Health Organization allowed scientists all over the world to feed into and provide information for the investigation. As a result of this collaborative effort supported by online communication media – a phenomenon referred to as ‘crowd sourcing’ – the DNA sequencing of the organism took only two days while in the past this would have taken two to three years (Casey, Hill, & Gahan, 2011).

## *2. To what extent do stakeholders and experts hold different views towards social media?*

This research question originates from the different goals experts and stakeholders pursue in food-related communication. Where the public well-being is the main task of experts, stakeholders in the food chain might be more interested in upgrading their own value. The community aspect of social media is perceived as more valuable by stakeholders compared to the experts. Social media makes it possible for consumers to group themselves in communities around a collective purpose and contribute to the production or dissemination of information (Cova & Pace, 2006). This idea of

'crowdsourcing' (Howe, 2006; Agerfalk & Fitzgerald, 2008) requires additional trust in the community and this forms a sensitive point for experts. The loss of control might trigger the fear for dissemination of incorrect or delicate information among the public.

Experts consisted of regulatory authority actors including food safety agencies, academic stakeholders and government sector officials and these groups are traditionally seen as the responsible actors for the public well-being by informing them about risks and benefits. Besides these responsibilities, it is important for them to build public confidence and credibility as communicators. Experience with cases such as genetically modified foods, food irradiation, and even functional foods, demonstrates that perceived food safety can drop dramatically when new information is spread without medical or scientific evidence (Verbeke, 2005b). Stakeholders might also be more in favour of prosumption compared to experts. There was more focus among stakeholders on the benefits of communities taking over their work, for example by sharing news (journalists and media), creating awareness around a specific brand (producers and retail) or inspiring more followers (consumer or non-governmental organisation).

### ***6.1.2 Examine the potential role that social media can play for information acquisition of consumers***

The remaining three objectives of the thesis focused on consumer perception of social media. In Chapter 3, the potential role of social media for incidental information acquisition was examined by means of an online survey with 497 participants in Flanders, carried out in March 2012. This survey investigated consumer interest in receiving information about the risks of pesticide residues from an official source through different social media applications like Facebook, Twitter, YouTube, Wikipedia, forums and blogs.

#### ***3. Which motives and barriers do consumers have to use or avoid information about food risks through social media?***

Results of the qualitative interviews with stakeholders and experts revealed that the high accessibility and the interactive environment entails the potential to capture the consumers' attention. The results of the consumer survey confirm these expectations. The most important motives for using social media as an information channel were the high accessibility and the speed by which information can be distributed across networks. The main barriers were also in line with the findings of Chapter 2. Untrustworthiness was the main barrier to avoid information about food risks through social media. The competition of traditional media was less important.

The characteristics offered by social media, such as timeliness, ability to construct one's own message, and the capability to reach a diverse range of audiences, makes it a superior tool for information dissemination during an emergent situation in which information needs to be spread quickly. However, the distribution of information is not the only task of communicators in times of crisis. An organization that takes responsibility or expresses sympathy with the victims is regarded as more honourable and understanding. As (Schultz, et al., 2011) describe, social media applications are especially useful in this area due to the opportunity of direct communication with the audience. Additionally, a growing number of people have started relying on Internet-based media forms as the primary channel to seek out crisis information (Jin & Liu, 2010). Social media may be better matched to crisis situations than traditional media, because the technologies allow for rapid information production and free uploading and downloading of content (Palen, et al., 2009).

4. *Which social media applications are perceived as most useful to acquire information about food risks?*

As Kaplan and Haenlein (2010) indicate, there are hundreds of different social media applications with new ones emerging every day. In this survey, some of the most popular and best known applications are evaluated including forums and blogs, YouTube, Wikipedia, Facebook and Twitter. Overall, consumers were found to have the highest belief in Wikipedia and the lowest belief in Facebook and Twitter as information channels. Although Wikipedia is an open-access online encyclopaedia that anyone can edit, perceived trust and usefulness scored high. A study that examined the everyday information seeking behaviour of young adults corroborates this outcome and found that applications such as Facebook, and blogs, were seen as serving the purpose of communication or interaction with friends rather than for news or information gathering (Williamson, et al., 2012). In contrast with Facebook and Twitter, Wikipedia was seen as an interesting channel for obtaining information. Therefore, food safety authorities and communicators are recommended to recognise this source of information and use its potential as Wikipedia is also frequently at the top of search engine results (Laurent & Vickers, 2009).

5. *Which consumers see opportunities to acquire information about food risks from official sources through social media?*

Effective communication through social media requires a clear identification and thorough understanding of the target audience that is willing to receive information through this means. A consumer segmentation approach was therefore used to identify segments of consumers who may benefit from social media being used as an official information channel to distribute information



about the risks of pesticide residues on vegetables. The segments with higher interest in social media displayed higher familiarity and higher appreciation for the opportunities of social media. These segments also contained relatively younger participants. Young Internet users in Europe are growing up with social media which makes these tools very familiar to them and more likely to attend to food risk messages on this channel.

### ***6.1.3 Investigate the potential contribution of social media for consumers who seek information about food-related risks***

The third research objective aimed at gaining a better understanding of the role that social media can play for consumer information seeking. A cross-national survey was carried out for this purpose with consumers from eight European countries: the Netherlands, Belgium, Ireland, United Kingdom, Italy, Germany, Spain and Portugal ( $n=1,622$ ) in September and October 2012. While Chapter 3 compared different social media applications, Chapter 4 explored the role of social media in comparison with other more conventional media such as traditional and online media.

#### *6. Which role can social media play besides more common information channels for consumers who seek information about food related risks*

Results of Chapter 4 indicate that social media can act as a complementary channel for at least a section of consumers to seek information about food risks. Interested consumers will utilize available channels in a complementary fashion to satisfy their information need instead of choosing between channels. The Internet and especially the evolution of web 2.0 technologies have made dissemination and production of information faster and easier than ever before. However, although information can be accessed more easily now, social media will not fulfil a role as substitute for online or traditional media. Consumers who were not interested in seeking information through these channels, did not reveal an elevated inclination to use social media instead. In Chapter 3 we found that low trustworthiness emerges as the main barrier for using social media as an information channel. Another issue could be that social media does not have the image of being useful as a channel due to low expectancy to find information about food risks or the lack of a filter resulting in possible information overload (Lu & Yuan, 2011). Lampe, et al. (2012) support our results; these authors reported that people were not inclined to use Facebook to actively seek information in their daily life.

7. *Which is the motivational, perceptual and socio-demographic profile of consumers who are inclined to use social media?*

Consumers do not form a homogeneous group with respect to information seeking. To specifically tailor information to the needs of interested consumers, more insight is necessary about the profile of social media users. A large part of the participants were not at all familiar or interested in using social media applications. However for the younger group of consumers, with an increased level of worry and information need about food-related risks, social media could act as a complementary information channel. This means that a messages targeting users through social media should take into account higher levels of emotions and worry among consumers and therefore should be easily interpretable (Loewenstein, Weber, Hsee, & Welch, 2001; Zhang, Pavur, York, & Amos, 2013). Results also revealed a different perception between the North and South of Europe towards social media as information channel. Over 60% of the participants of the *'High cross-channel inclination'* segment came from Spain, Portugal or Italy.

**6.1.4 Characterise the potential use and role of deliberative engagement between consumers and communicators**

The importance of public interaction and exchange of information in risk and benefit communication has been well acknowledged (Rowe & Frewer, 2000). The objective of Chapter 5 was to characterise the potential use and role of deliberation in an online environment between communicators and the public. Data of Chapter 5 were gathered using the newly developed online software VIZZATA™, which offers the opportunity for an on-going interaction between the communicator and the audience. 150 participants from the UK, Belgium and Portugal participated in an experimental online study during July and August 2012 which aimed at developing a behavioural measure of deliberative activity.

8. *Can deliberative engagement be assessed as a behavioural measure and if so, how is this measure composed?*

With the help of the VIZZATA™ tool, a better understanding was achieved in the nature of consumer deliberation in an online environment. This tool allowed to see how individuals evaluated the opportunity to interact with communicators about the risks and benefits of red meat. The concept of deliberative activity was validated as an activity resulting from four indicators: the number of questions asked by participants about the online stimulus material, the number of comments left by participants, the number of glossary terms accessed, and the time spent reading the online stimulus

material. Where previous research has focused on deliberation as a method for policy makers to obtain a picture of consumer understandings that are collectively developed about a specific topic, our approach explored deliberation as manifest in an individual's activity.

*9. What is the effect of online deliberation on information recall?*

Incorporation of the views of the public and relevant stakeholders is of major importance in effective risk management in the food sector. Consumers on the other hand can also gain from engaging in deliberative activity. The research presented in Chapter 5 found that online deliberation positively influenced consumer information recall. Previous studies have indicated that communicating balanced information about food is a difficult task (Roosen, Marette, Blanchemanche, & Verger, 2009). Therefore, risk communicators should grasp the opportunities that are becoming available to them. The widespread use of the Internet and the emergence of social media are creating a shift in the traditional communication model in which the communicator had control over the message and how it is spread (Hoffman & Novak, 1996). Although the integration of social media in the communication strategy might worry some food communicators as shown in Chapter 2, engaging into a dialogue, whether online or offline with consumers can lead to better informed consumers. These findings are supported by the work of Bjoernes, Laursen, Delmar, Cummings, and Nøhr (2012) who concluded that an online asynchronous dialogue between healthcare professionals and prostate cancer patients can accommodate the individual patients' information and communication needs.

*10. Which factors influence deliberative activity of consumers?*

Based on cognitive dissonance theory (Festinger, 1957), the heuristic-systematic model (Chaiken, 1980) and the RISP model (Griffin, et al., 1999), three determinants were proposed to predict individual deliberation: Personal relevance, information sufficiency and perceived complexity of information. While personal relevance and information sufficiency had no significant influence, perceived complexity had a negative impact on the behavioural measure of individual deliberation. Participants who perceive provisioned information as too complex might prefer to avoid this instead of feeling incompetent to deal with it. In their analysis of social media use among public health departments Thackeray, et al. (2012) stated that "it is important to communicate information in a way that reflects the audience preferences, stimulates response or discussion, and is tailored to the social media application" (p. 9).

## 6.2 General conclusion and policy recommendations

Social media are extremely popular among citizens as a way to keep in touch with friends and family, find new friends or keep up with the latest news (Intel reports, 2011). The overall objective of this dissertation was to assess the value of social media in food risk and benefit communication and provide evidence-based guidance to risk communicators on how best to employ these media. Developing a social media strategy requires organisations to identify the aims and objectives of engaging with social media for their organisation, as well as identifying available resources (time and money) for social media activities.

As stated in the introduction of this dissertation, the ultimate goal of risk and benefit communication is to assist consumers in understanding the rationale behind risk-based decisions and to make sure that they are well informed about and aware of food risks and benefits. Consumers use different forms of information gathering, ranging between ignoring information, passive attention to information, active seeking for information and even engaging in discussion. In relation to food risks and benefits, social media score relatively low as an additional channel for information seeking. While consumers may not be engaging in a large amount of information seeking on social media, consumers do think it provides them with useful information. This difference highlights the distinction between searching for a specific information need and encountering useful information incidentally. For example, social networking sites make it possible to follow interests through their News Feed. Ideally, this creates an information environment where more or less valuable information is pushed to more or less interested receivers without much social friction (Skageby, 2011). To disseminate information more effectively, it is advised to provide information that is user-friendly to spread.

While social media are not perceived as the best channels for information seeking, their indirect impact should not be neglected. For example, many journalists increasingly rely on social media as a source of information and news. Secondly, through search engines consumers are confronted with consumer-generated content as social media applications are generally seen as search engine friendly due to activities like tagging (i.e. the linking of content to key words) and extensive use of hyperlinking. Tagging is a strong mechanism that helps to situate an individual piece of information within a broader conversation and allows this piece of information to be easily found. For example, hash tags are used on Twitter to associate the content of a tweet to a particular topic and very recently, 13<sup>th</sup> of June 2013, Facebook has announced the introduction of hash tags (Bosker, 2013).

The goal will be to help people more easily discover what others are saying about a specific topic and participate in public conversations.

The outcome of the chapters investigating information seeking and acquisition indicated that especially a younger audience appreciates social media use for food risk communication. Young Internet users in Europe are growing up with social media which makes these tools very familiar to them and thus, they may be more likely to see its value as a communication channel. Younger consumers may be more likely to attend to food risk messages on this channel, particularly if delivered in a manner known to be effective (e.g. making use of viral marketing techniques such as competitions or infotainment). The potential impact of social media will likely increase in the future as a growing percentage of the population is raised within a social media environment. A survey among 882 Belgian students that assessed the impact of Facebook during the exam period confirms this assumption (De Morgen, 2013). Results pointed out that up to 99% of the students used Facebook to exchange information about the upcoming exams with classmates and up to 50% believed that their results would improve because of the use of Facebook.

Another principle deemed to be of importance in food risk and benefit communication is that of honesty, openness, and transparency (Seeger, 2006). This not only refers to the content of the message, which undoubtedly needs to be fact-based and accurate, but also the process of communicating the information itself. The very act of providing consumers with information instils a quality of transparency in those doing the communicating (Renn & Roco, 2006). Social media offers the opportunity to strengthen this quality of transparency by allowing communicators to have a voice on many different social media channels, and in effect, showing a strong presence in delivering information when most needed and when most expected. If consumers perceive that communicators are making every effort to get information across, this may build credibility and trust in the message and the communicator.

There will be no quick and easy method of countering the inaccurate information available online nor will one ever be able to realistically expect that the same level of regulation over content that occurs in traditional media will occur on the Internet and with social media. The online environment can be a minefield of information which is incorrect or misleading, whether inadvertently misconstrued or intentionally altered as a result of vested interests. Nevertheless, there are some steps which individual stakeholders may take in order to begin to address this challenge. Above all, it is imperative that an organisation, institute or body has an online presence in order to rapidly address

developing memes containing inaccuracies and misinformation, thereby ensuring that a momentum does not build up.

The active role of consumers in communication, empowered by social media, not only causes troubles to communicators. More positively, it also provides a means for better consumer understanding and communication. This can be accomplished indirectly by monitoring the online environment or directly by engaging in conversation. Social media is opening a window of opportunity from the early detection and surveillance of food contamination incidents (Newkirk, et al., 2012). Monitoring of online conversations can provide insight into consumers' perceptions of food issues and allows detection and tracking of impending issues and on-going debates. It can also be used to evaluate the impact and reach of an official press release by following online response and interest or even to assess consumer trust in the communicating authorities. Not online conversations can provide consumer insights. Monitoring queries to online search engines, which are submitted by millions of users around the world each day, provides a wealth of information that reflects the "collective intelligence" of a population (Ginsberg, et al., 2009). For instance, in 2008 Google developed Google Flu Trends which rapidly became a near real-time detection system of influenza outbreaks in the United States. A close relationship was seen between the number of people searching for influenza-related topics through search engines and the incidence of influenza among a population in a particular region. By analysing queries in near real time, Google Flu Trends managed to detect regional outbreaks of influenza 7–10 days before conventional CDC surveillance systems (Carneiro & Mylonakis, 2009).

Two-way dialogue and engagement are essential good practice in food risk and benefit communication. Understanding the needs and concerns of the public is essential to maximise the effectiveness of communication. Social media provides a new means of interaction and can be used to directly respond to comments and questions of the public. Website interactivity can be presented on two levels: social interactivity (i.e. reciprocal communication through feedback mechanisms (Song & Zinkhan, 2008)) and mechanical interactivity (i.e. active consumer control through the use of hyperlinks (Sundar, Kalyanaraman, & Brown, 2003)). Both forms of interactivity contribute to the engaging element of social media (Xenos, 2008). The commitment to go into direct contact with one's audience requires immediacy and flexibility. Neglecting consumer attempts for deliberation can even result in others taking over the role of the communicator and providing potentially inaccurate information to the public (Agostino, 2013). In order to limit the spread of unreliable information, it will be necessary for food risk stakeholders to actively engage with users online and to correct any fallacies before further amplification or attenuation of a risk can occur.

### **6.3 Scientific contribution**

The scientific contribution of this dissertation on a conceptual, methodological and empirical level put forward in Chapter 1, has been achieved. This doctoral dissertation has developed a framework that underscored the user-centric environment social media introduced and takes into account changes in information flow. By incorporating theories from adjacent fields of research, the traditional communication framework has been extended and the role of social media for consumers has been discussed on the level of information acquisition, information seeking and public participation about the risks and benefits of food.

To investigate the preconceived research questions, different existing methodologies as well as new methodologies were applied. Each of these methodologies have their own limitations. However, the combination of different methodologies and data collection techniques allows us to draw stronger conclusions than through a singular approach. The application of different methodologies, adapted to the specific investigated audience, allowed to associate the views of communicators with the views of consumers.

Measuring reaction to the concept of social media was done with a construct based on a variety of best known applications. Internal reliability analysis of multiple items, including Facebook, Twitter, forums, blogs and YouTube, measuring people's reaction to social media applications affirmed that this measure was satisfactory as a construct representing the concept social media. The empirical findings of this dissertation have given insight in consumers and communicators perception of the usefulness of social media for the communication of food risks and benefits and allowed to develop policy recommendations for future social media use.

### **6.4 Limitations and future research**

The results of this doctoral research contribute to food risk and benefit communication through a better understanding of the unique role that social media can play in providing effective and efficient information about food safety. Nevertheless, there are limitations associated with this research which need to be acknowledged and which also open up opportunities for further research.

The methodologies used for sampling and data collection that are applied in this doctoral dissertation imposed some limitations to this doctoral research. The data from Study 2, 3 and 4 are collected through web-based data collection methods. This excludes persons who do not have access to Internet, but allowed the collection of a substantial amount of good quality data in a relatively

short time notice against relatively low costs. This may also have led to an overrepresentation of highly educated participants as consumers from different socio-economic backgrounds may have differential access to the Internet. In Study 1 the SWOT and SOR method was implemented with a relatively small number of participants. The limited sample size however did not endanger the quality of the results of the analysis. The significance of the results of a SWOT and SOR analysis is defined by the decision-making position and high involvement of the participants, rather than their number (Van Wezemaal, et al, 2013). The findings of Study 4 were also based on a small and non-representative sample of consumers. The design of the study required that a team of researchers was ready to respond to large set of questions and comments of participants within a short time span of two weeks. A higher number of participants and subsequently a higher number of questions and comments could have led to a reduced quality of the provided answers or an extended timeframe to respond for the research team. In Study 2 data were gathered through convenience sampling. As a result, findings from Study 2 and 4 cannot be generalised to the overall population.

The scope of the research is focused on the value of social media. One difficulty encountered was to demarcate the boundary of 'social media'. The focus on specific applications also demands a thorough understanding of currently used tools and popularity among consumer segments. Social media are continuously evolving in the fast changing online environment. Current popular tools as Facebook and Twitter might one day become outdated in the on-going evolution of online technologies. Therefore, it is important for scientists to follow emerging trends and tackle the issue of social media in a broader perspective. While Twitter as a tool might become outdated, the use of short messages, and the interactive exchange of information, will continue to have a long-term impact on the communication. Facebook has taken over the role of MySpace as the main social network and might be replaced in the future by Google Plus or another upcoming competitor. The main principle of social networks however, online communities that allow users to connect, interact and exchange information, will remain a popular concept among the general public. Future research investigating social media should take into account the changing nature and popularity of online applications.

The use of a self-reported measure of intended information seeking and information acquisition in Study 2 and 3 can be seen as limitation of these studies. Where social media received generally lower scores as information channel, actual behaviour might point to different findings. When it comes to information seeking channels, search engines play a main role in determining where users will go to find information, which was also confirmed by our results. Hochstotter and Lewandowski (2009) showed that social media websites such as Wikipedia, YouTube and Yahoo! Answers were very



popular in search engine queries. Even if social media applications are not used to seek information directly, chances are high that information is encountered passively through these channels (Rutsaert, Pieniak, Regan, McConnon, & Verbeke, 2013). This leads to the question of *How consumers actually behave when they use the Internet (and possibly social media) to seek and acquire information about food-related risks and benefits.*

A large part of the research implemented in this dissertation was explorative in nature due to scarcity of previous studies and existing literature about the value of social media in food risk and benefit communication. The findings about information seeking and acquisition are mainly derived from cluster analyses which revealed consumer segments with a general interest in social media for food risk and benefit communication. More advanced research designs and corresponding analyses are necessary to evaluate the impact of numerous elements on food risk and benefit information provision through social media. An important element is the interplay between source and channel. Where many studies have highlighted the importance of information sources in food risk communication (Eurobarometer, 2010; Kornelis, et al., 2007; Pieniak, Verbeke, Scholderer, Brunso, & Olsen, 2007), consumer preferences for and use of various information channels has been less of a focus. Of course considerations of sources and channels are not mutually exclusive; due consideration of channels and of sources will be informed by understanding the dynamics between them. Research has shown that in many cases, consumers don't make a clear distinction between source and channel (Kioussis, 2001; Sundar & Nass, 2001). Given that social media also gives individuals the opportunity to become source or channel and develop or disseminate information, this relation becomes even more complex. *Research is needed to investigate the interplay between source and channel in the area of food risk and benefit communication.*

The spread of mobile media devices, such as smartphones and tablet computers, are providing a completely new way to interact with information (Zhong, 2013). These devices facilitate online connectivity and as a result, social media applications are moving away from desktop PC's and laptops, toward mobile devices. (Kaplan & Heinlaen, 2012). This evolution allows users to access information wherever and whenever they want: at home, abroad, while travelling,... *The question is whether this change in location and environment might also alter how people seek and respond to information about food risks and benefits?*

A final element that should be mentioned in the light of social media is that of prosumption. Content creation and dissemination by consumers has primarily been perceived negatively by communicators, leading to loss of control and a potential spread of misinformation. However, by

facilitating Internet users' engagement in the creation and delivery of accurate food information, social media applications can strengthen communicators efforts to disseminate and amplify valuable messages among target audiences. Paek, Hove, Jeong and Kim (2011) argue that on websites based on user-generated content such as YouTube, audiences expect to encounter videos produced by lay people similar to themselves, instead of videos of professionals or official organisations. Their findings concerning public service announcements propose that YouTube messages from peer producers were more effective than from experts among low-involved viewers. While these results advocate the stimulation of prosumption, it should be recognized that prosumption and the creation of user-generated content cannot be controlled or forced (Ritzer & Jurgenson, 2010). Consumers maintain the freedom whether or not to contribute in the creation of dissemination of information. Therefore more insight is needed in the motivations underlying prosumption tendencies. *What motivates users to contribute in the creation or dissemination of information and can prosumption be effectively used for food risk and benefit communication?*



# Appendices

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## Appendix I: The SWOT components (Chapter 2)

SWOT	Statements	BE	IE	IT	NL	LV	SP
<b>Internal strengths</b>							
Speed	Speed	X	X	X	X	X	X
	Communicate in real time Instant feedback from consumer						
Interaction	Interaction with public	X	X	X	X	X	X
	Direct contact to consumers Share information directly with consumer						
	Every day you can change the tone of the message and receive the feedback from the public						
	Receive citizens feedback by reporting societal issues						
Peer-to-peer awareness	Peer-to-peer awareness	X	X	X	X	X	
	Message is pushed Share expertise and experiences						
	Possibility to monitor what consumers think forward by peer to peer awareness/ fast dissemination						
	Identify consumer needs Information is transferred from peer to peer: if a person “likes” something, then a friend sees this and they can “like” it too → potential to push forward a message						
	Create viral message						
Accessibility	Cheap	X	X	X		X	X
	Easily accessible User friendly						
	Free tool and open to everybody Don't have to be IT specialist to use it						
Technological possibilities	Combination with mobile technologies	X	X		X	X	X
	Integration of video, audio and pictures						
	More possibilities than with fixed website						
	Multiple channels of information can be used Promote your original website						
<b>Internal weaknesses</b>							
Low trust in source	Anonymous/ unidentifiable source	X	X	X	X	X	X
	Hard to verify information from some channels Wrong information is being spread						
	Bad information can lead to crisis News is not created, views are created						
No filter	Opinions of lay people	X	X	X	X	X	X
	Everybody becomes source of information No filter						
	Everybody can put on there what they want Opinions are spread as facts						
Continuous investment needed	Obligation to answer to all questions	X	X		X	X	X
	No room to check information Training of personnel is needed						
	If you're on there, you have to engage and be active, expectations are created						
	Serious time investigation						
Privacy concerns	No clue on privacy concerns	X	X	X	X	X	
	No control on information source No control over what the public will see: open forum						

	Information becomes unguided projectile Information you spread can be used by people with a vested interest beyond your control							
Negative image	Misuse by marketing and commerce: Used by companies to advertise and discredit others Used for pleasure, not for information Lacking familiarity in organization Fear of the unknown Negative publicity travels fast	X	X	X		X	X	
External opportunities								
Need to reach specific audience	Used by traditional media as information source Create awareness about a topic reach Reach target population (sub)groups	X	X	X	X	X	X	X
Crisis communication	Get your message out there instantly Can be used for recalls Useful in crisis situation	X	X	X	X	X	X	X
Popularity of communication technology	It's modern and of its time It's where the people are	X	X		X	X	X	
Group feelings	Community feeling: engagement with audience and share ideas Conversation discussion with real people Generate followers and friends to create community Replaces family and friends	X	X	X	X	X	X	X
Need for unbiased information	Use it besides traditional media to spread information Time investment is necessary but it's our job to inform If you are not there, others will provide information which is not always correct	X	X		X	X	X	
External threats								
Fast changing area	Fast changing area Still in infant shoes Putting big investment into an area that might be redundant in a few years	X	X	X	X	X	X	X
Information crowd and overload	Information overload Information gets lost in the noise Difficult to communicate a balanced message, loss of nuance Too much repetition of information Objectivity can get lost in rumours	X	X	X	X	X	X	X
High trust in traditional media and channels	Consumers prefer radio and television to be informed Only reach a limited demographic audience	X	X	X		X	X	
Low consumer interest in online information	Audience chooses his interests, can't be forced or pushed to listen to you When interacting with a very big audience, you rarely get feedback Message you send is not spread by the public because not interesting enough	X	X					X
Emotional behaviour	People say what they want and don't think about the consequences Creation of a plat form for "extreme views" – objectivity is lost and rumours build Battle against misinformation → can lead to disbelief of your message	X	X	X	X	X	X	X

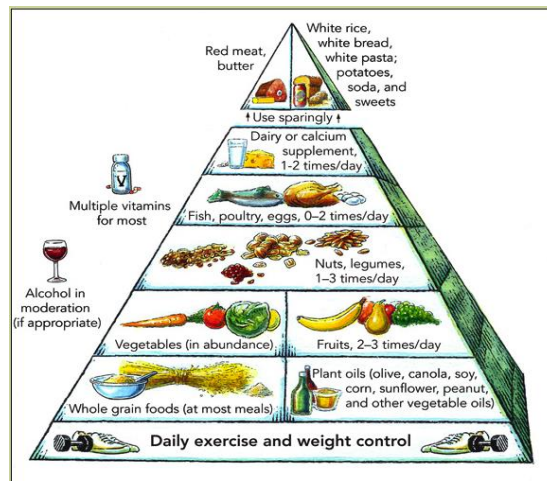
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## Appendix II: Content tester pages (Chapter 5)

### CT1: Introducing red meat

Red meat is an important part of the diet of many people in (UK/Portugal, /Belgium) and across Europe. Most red meat is eaten in the developed Western world although the rate of red meat consumption has been declining in Europe over the last twenty years (Robinson, 2001). How much red meat is eaten varies between countries and also between men and women - overall men tend to eat much more red meat than women, 108g versus 72g per day. Accurately quantifying the amount of meat consumed in the diet is problematic, owing to the fact that meat is typically consumed as part of a meal, often containing other foods such as vegetables, or pasta, legumes or potatoes (Cosgrove et al., 2005). Some people avoid eating all red meat or some types of red meat. This may be for ethical or religious reasons - or for reasons of health or of cost.

Before we discuss red meat, let's clarify what we mean by this term. Meat can be broken down in red meat, white meat and processed meat. Red meat includes beef, veal, lamb, and pork (fresh, minced and frozen), while white meat includes chicken, turkey, and duck. (Linseisen et al., 2002) Processed meat includes ham, bacon, sausages, hamburgers, salami, corned beef and tinned meat. However, in this study we are only thinking about red meat.



Public health specialists recommend the amounts of red meat that we should eat. 10 years ago, no distinction was made between red and white meat but now there are different recommended amounts for each of them. It used to be that the consumption recommendation for red meat was that we should eat it '2/3 times per week', this has now changed to 'occasionally'. We can see this in the food pyramid (Willett and Stampfer, 2003).

***CT2: What are the possible risks of eating red meat?***

While red meat is generally safe and is widely consumed by the public, its consumption has been linked to certain risks of chronic disease. Chief among these are cardiovascular diseases and colorectal cancer (also known as bowel cancer) (Smolinska and Paluszkiewicz, 2010). Cardiovascular diseases have been linked to the high saturated fat content in red meat and thus to the build-up of cholesterol in the body. It has been suggested that the link between red meat and colorectal cancer may be due to the compound that gives red meat its colour, haem, which may damage the lining of the bowel. Other studies have suggested that certain carcinogenic compounds are released when meat is cooked at high temperatures and that red meat cooked at 250°C can be up to eight times more mutagenic than the same meat cooked at 100°C (Benassi-Evans et al., 2009).



At the same time, a diet high in meat, alcohol and low in fruit and vegetables has been associated with a 22% increase in the risk of colon cancer compared to a diet low in meat and high in fruit and vegetables (McAfee et al., 2010). However, the scientific evidence is not always clear-cut: a study conducted in 2002 found that in the UK the incidence of colon cancer has increased despite a decline in meat consumption (Hill, 2002).



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The evidence on the links between red meat consumption and various diseases is not always conclusive and sometimes the findings may seem to point in different directions. Nevertheless, the general nutritional advice is that consumers should eat no more than 70g of red meat per day, avoid processed meat (or keep it to no more than two portions a week), and choose lean meat whenever possible. A balanced diet and careful preparation of red meat should enable consumers to benefit from its nutritional value while at the same time minimize its risks to health (SACN, 2010).

***CT3: Are there other risks associated with red meat?***

Red meat has also been associated with a number of risks which do not relate directly to human health. As red meat production requires large amounts of land for grazing, it can impact on the production of more environmentally friendly foods such as cereals and vegetables . Many have argued that in the long run red meat production can lead to soil erosion and food scarcity. The meat production process requires large amounts of water and at the same time it releases fertilising compounds. Both of these things can have a negative impact on river and lake ecosystems. In addition, meat production accounts for about 5% of global CO<sub>2</sub> emissions, 40% of methane emissions and 40% of various nitrogen oxides.



Red meat production, and in particular beef, has also been linked to the deforestation of vast areas of land, such as the Amazon forests in Brazil. Greater demand for meat from fast-developing

economies such as China and India has increased the carbon footprint of red meat production. It has been calculated that producing 1kg of beef results in more CO<sub>2</sub> emissions than going for a three-hour drive while leaving all the lights on at home. Because of this, some scientists and environmental activists have begun to argue for a reduction of red meat consumption, and indeed many consumers are nowadays opting for organic red meat as the environmentally friendly alternative. For example, a Swedish study conducted in 2003 claimed that raising organic beef on grass rather than feed reduced greenhouse gas emissions by 40% and consumed 85% less energy. Other consumers are opting for quorn or soya-based alternatives to meat, which have an even lower environmental impact. Ultimately, for many Western consumers, eating red meat is a lifestyle choice.

***CT4: The nutritional benefits of eating red meat***

Red meat is associated with many health benefits, as it can make an important contribution to our nutrient needs. It provides a number of essential nutrients like iron, zinc and selenium (Wyness et al., 2011). In particular, some of these nutrients are more available in meat than in alternative food sources. Red meat is also a good source of vitamins like vitamin B12, which has an important role in the normal functioning of the brain and nervous system, and for the formation of blood (Cosgrove et al., 2005). Red meat also provides vitamin A, which some evidence suggests is a protective factor against development of COPD (Paiva et al., 1996). Red meat is also known to contain long fatty acids, which have been shown to help protect against the risks of developing heart disease (McAfee et al., 2010). Lean red meat is particularly healthy, and in moderate consumption has been found to lower total cholesterol.



It is generally accepted that red meat can increase satiety more quickly than other forms of food. Some studies have produced evidence that consuming protein may reduce subsequent food or energy intake compared to carbohydrate or fat, thus it may be beneficial to replace refined carbohydrates with protein sources that are low in saturated fat, such as lean red meat (Wyness et al., 2011). By being more satiating, higher protein meals and diets may help better to control bodyweight. However, it is worth bearing in mind that many studies have looked at dietary patterns rather than just at meat consumption, therefore the benefits of red meat are not absolutely certain.

A discussion about red meat raised with vegetarians by some is the nutritional requirements of children. As children have higher metabolic rates and consequently higher energy requirements than adults, there is a need for high nutrient intake (Sanders and Reddy, 1994). As mentioned before, red meat provides some nutrients that are scarce or absent from common foods of plant origin.

***CT5: Possible benefits of eating red meat that don't relate to nutritional value***

There are many aspects of red meat that people value - not necessarily related to nutrition. Some of these are linked to culture - eating red meat is part of the daily diet of many consumers in Western Europe, and can be an important part of being included in meals and social occasions and interactions, for example at events such as barbeques (McAfee et al., 2010). Furthermore, the way different cultural groups cook meat and their national dishes is often an important aspect of who

they are: cultural identity can be expressed via food and red meat is sometimes part of this. Also, the pleasure that people get from eating red meat plays a central role in why red meat is so widely consumed. . As well as taste there are other ways that people get pleasure from eating meat (Audebert et al., 2006).



The meat sector is one of the most important sectors in European Union agriculture. The EU is a major meat producer in global terms, accounting for over 16 % of world meat production and is a big player in meat trading (European Commission, 2004). Red meat consumption helps support European and national farmers, which is good for the economy as it maintains people employed in the agricultural sector. The production of red meat is also important in environmental terms as it can have an important contribution to the ecosystem. Livestock manure can benefit soil and plants by supplying nitrogen, phosphorus, potassium, and micronutrients. However, an over usage of manure could lead to pollution of soils and water (Dawson et al., 2011). That's why farmers are encouraged to reduce the number of animals per hectare of land so that production systems are sustainable. Farms with grazed livestock such as sheep and cows have shaped the environment in many regions of the EU and have become part of the traditional landscape.

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**CT6: What are the latest findings on red meat?**

Earlier this year, an article in a prestigious medical journal published evidence that a diet high in red meat shortens life expectancy. The BBC ran a feature on this article on its website. Please read it below and let us know what you think.



## Red meat increases death, cancer and heart risk, says study

*A diet high in red meat can shorten life expectancy, according to researchers at Harvard Medical School. The study of more than 120,000 people suggested red meat increased the risk of death from cancer and heart problems. Substituting red meat with fish, chicken or nuts lowered the risks, the authors said. The British Heart Foundation said red meat could still be eaten as part of a balanced diet. The researchers analysed data from 37,698 men between 1986 and 2008 and 83,644 women between 1980 and 2008. They said that during the study period, adding an extra portion of unprocessed red meat to someone's daily diet would increase the risk of death by 13%, of fatal cardiovascular disease by 18% and of cancer mortality by 10%. The figures for processed meat were higher, 20% for overall mortality, 21% for death from heart problems and 16% for cancer mortality.*



*The study, published in Archives of Internal Medicine, said: "We found that a higher intake of red meat was associated with a significantly elevated risk of total, cardiovascular disease, and cancer mortality. This association was observed for unprocessed and processed red meat, with a relatively greater risk for processed red meat."*

*The researchers suggested that saturated fat from red meat may be behind the increased heart risk and the sodium used in processed meats may "increase cardiovascular disease risk through its effect on blood pressure". Victoria Taylor, a dietitian at the British Heart Foundation, said: "Red meat can still be eaten as part of a balanced diet, but go for the leaner cuts and use healthier cooking methods such as grilling.*

<http://www.bbc.co.uk/news/health-17345967>

### **CT 7: Lab-grown meat video**

Recently, scientists have started developing in-vitro meat as a low-impact alternative to meat, although research in this area is still in its infancy. In-vitro meat is synthesised meat that is grown in the lab, usually starting from a culture of living animal muscle tissue. Unlike the usual meat production, a single animal could provide the material for hundreds of tonnes of meat.

Please watch the video below and tell us what you think.



[http://www.youtube.com/watch?feature=player\\_embedded&v=iO9g\\_paCcWA](http://www.youtube.com/watch?feature=player_embedded&v=iO9g_paCcWA)

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## Appendix III: Glossary terms (Chapter 5)

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Content	Glossary term	Description
tester		
CT1	Avoid	Some people choose to be vegetarian, for various reasons such as health, religion, or animal rights. For example, according to a study from 2006, in [name of respective country], [%] is vegetarian. 2% of the Belgian population is vegetarian. (Portugal: 0.3%, UK 6%) ( <a href="http://www.raw-food-health.net/NumberOfVegetarians.html">http://www.raw-food-health.net/NumberOfVegetarians.html</a> )
	Religious	For example, In India, the cow is seen as a sacred animal and eating beef is taboo, while Muslim and Jewish people avoid eating pork.
	Processed	This includes meat that is subject to preserving methods other than freezing, such as salting, smoking, marinating, air-drying or heating. (Linseisen, et al., 2002)
	Food pyramid	A food guide pyramid is a triangular or pyramid-shaped nutrition guide divided into sections to show the recommended intake for each food group
CT2	Cardiovascular diseases	Cardiovascular disease is a broad class of diseases that involve the heart or blood vessels (arteries and veins). The three main types of CVD are coronary heart disease, stroke, and peripheral arterial disease. Blood flow to the heart, brain or body can be reduced mainly because of a blood clot or a build-up of fatty deposits inside an artery, leading to hardening and narrowing of the artery.
	Cholesterol	Cholesterol is a fatty substance known as a lipid and is vital for the normal functioning of the body. It is mainly made by the liver but can also be found in some foods we eat. Having an excessively high level of lipids in your blood (hyperlipidemia) can have an effect on your health. High cholesterol itself does not cause any symptoms, but it increases your risk of serious health conditions.
	Lean meat	Certain cuts of meat are lower in fat. Lean cuts of beef include round, chuck, sirloin and tenderloin. Lean cuts of pork or lamb include tenderloin, loin chops and leg. Lean meat generally has between 5%

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		and 10% fat and contains a higher proportion of protein than fattier cuts.
	Mutagenic	A physical or chemical agent can be mutagenic if it can change the genetic material of a living organism. X-rays and chemical pollutants are well-known to have mutagenic properties. Many mutagens are also carcinogens because genetic mutations often lead to cancer.
CT3	Soil erosion	The loss of the nutrient-rich top layer of soil due to over-grazing, landslides, unsustainable agricultural practices, flooding, deforestation, etc.
	Methane	Methane is a gas expelled by most animals which has been found to contribute to global warming.
	Carbon footprint	Carbon footprint is a measure of the impact of a human activity on the environment, and is expressed in terms of total emissions of greenhouse gases.
	Quorn	Quorn is a mock meat made of mycoprotein derived from a fungus whose structure is similar in length and width to animal muscle fibres. Quorn is low in fat and has a high protein content.
CT4	Selenium	Selenium acts as a precursor for substances in the body which are protective against cancers.
	COPD	Chronic Obstructive Pulmonary Disease is the occurrence of chronic bronchitis or emphysema in which the airways become narrowed.
	Long fatty acids	Long fatty acids are long molecules of carbon which are an important fuel for the body.
	Satiety	The feeling of fullness obtained from food.
CT5	Cultural identity	Cultural identity refers to the values, norms, beliefs and practices that are shared by groups of people. Sharing a culture means that people have a common view of the world, but also of themselves as individuals.
	Other ways people get	Studies have found that other factors influencing meat consumption in addition to taste are smell, convenience, health and price.

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pleasure

Ecosystem      An ecosystem is a community of living organisms (plant and animals) in combination with the non-living components of their environment (things like air, water and mineral soil).

Sustainability      Meeting the needs of the world now without making it difficult for future generations to meet theirs. Sustainable practices mean using current resource without overexploiting them.

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**Appendix IV: An example of comments and questions asked on the different content testers (Chapter 5)**

Content tester	Comments	Questions
Introducing red meat	<p>One should not analyse food that much, it's a basic need. Red or white meat, what does it matter. It is all good if you eat it with moderation. It is necessary for my children.</p> <p>I didn't realise that pork was classified as red meat.</p>	<p>Why do men eat more red meat than women? Which nutrient do they need more than women?</p> <p>With what do you have to replace red meat? All the time white meat is also not healthy.</p>
Possible risks of eating red meat	<p>I know people that eat cereals, fruits and vegetables and are notoriously more healthy.</p> <p>Didn't know that red meat increased the chance on bowel cancer and vascular diseases. Somewhere this is quite logical if you link it to the saturated fats/ cholesterol.</p> <p>I had to reduce red meat consumption due to medical advice (high blood pressure and cholesterol).</p>	<p>There is a myth that says that red meat grilled in charcoal may contain carcinogenic properties. How far can this true?</p> <p>If the studies aren't conclusive why do you advise to reduce consumption?</p> <p>I'm a very active person. I walk 5km a day, a go to the gym 3 times a week, and I eat red meat every day. In this scenario, the fact that red meat has fat in it, is not balanced by my active life-style?</p>
Other downsides to red meat	<p>The environmental issue: The deforestation due to cattle is doubtful, it is also due to oil extraction from palm trees.</p> <p>I always thought that the liberation of fertilizer compounds was good for the environment.</p> <p>I feel sad I can't find organic meat at an accessible price.</p>	<p>Quorn: does it exist in Portugal?</p> <p>What is organic red meat? I am confused. In the beginning you say that meat requires large amounts of pasture, and now you say that cattle feeds of pasture instead of feed/ration.</p> <p>Has scientific research been carried out about the reduction of CO2 and other emissions of the meat industry?</p>
Benefits of eating red meat	<p>The way you cook red meat may also influence your diet.</p> <p>Happy to finally hear the advantages of red meat. Mostly, you always hear the negative much faster than the positive.</p> <p>My children can't become vegetarian before they are physically full grown.</p>	<p>Why do you need zinc and selenium?</p> <p>Is red meat bad for rheumatism?</p> <p>Which are the alternative sources of all these stuff?</p> <p>How much red meat is healthy to eat in a week?</p>

Other values to red meat	<p>Cultural identity: I'm from a family with great tradition when it comes to eating. Big steaks, big meals. And since my grandparents have surpassed the 80's margin I'm anxious to know the benefits of red meat.</p> <p>This is nice to hear. In general, I find it important to eat a versatile diet and for my case also with red meat, around 2 times per week, also chicken, grains, vegetables, fruit,... But when all the animals are well treated, this shouldn't be a problem as long as you switch around.</p>	<p>Which are the benefits in children and adults development?</p> <p>Why do I need to read statistics ?</p> <p>What do you mean by lean red meat? Is it healthier processed or not?</p> <p>By a farmer point of view, is red meat a good business? I mean, do they do a reasonable amount of moneys?</p>
Red meat in the news	<p>I was a little bit scared by this news.</p> <p>It is a trustworthy study with a large sample.</p> <p>This news is only one study and stands for little. Moderation is the key to consumption.</p>	<p>What is the relevance of red meat for health? To what extent is red meat still healthy?</p> <p>Is there a difference between packaged meat (film or vacuum) and the meat sliced at purchase?</p> <p>am wondering if the consumption of red meat is really the reason for their results? Was there nothing else that matches with their lifestyle that could be the cause of this? Or was this filtered out?</p>
Synthetic meat	<p>It sounds weird the fact that synthetic meat is created in a lab.</p> <p>Everything is possible, I think you should continue with the study over synthetic meat.</p> <p>I am not pro genetically modified food.</p> <p>This sounds unhealthy and disgusting.</p>	<p>What is the taste of synthetic meat? Is it really the same?</p> <p>How much billions would they put in their pockets if this worked?</p> <p>What would happen to the animals that were not required anymore?</p>





# Summary

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Effective communication of food risk and benefit issues has been a key area of research in the last decades. Good communication attempts to bridge the divides between scientific experts, policy makers, industry marketers, and consumers. The rise of web 2.0 and the growth of social media has created a shift in flow and amount of content and therefore demands a renewed vision on best practices in communication. Social media is the collective name for a number of online applications, including social networks, video- and picture-sharing websites, blogs, and microblogs, that allow users to generate and share information online. There is no filter with respect to accessing social media and very few barriers to stop people from publishing unverified information. These evolutions form the basis of both the most interesting opportunities and at the same time the greatest threats of social media. Where communicators are provided with new channels to tailor communication to consumer preferences, the public has been given the opportunity to become actively involved in the communication process. New levels of public engagement have emerged ranging from passively receiving information to actively pursuing discussion with communicators.

The overall objective of this doctoral thesis was to contribute to a better understanding of the role of social media in communication of food-related risks and benefits. The aim was to offer evidence-based recommendations relating to the use of social media, a platform that may prove both useful and essential as a part of future food risk and benefit communication strategies. The research is based on data which have been collected in the scope of four different studies that are executed independently from each other, and include different sets of respondents. Qualitative (in depth interviews (n=71)), quantitative (surveys in Flanders (n=497) and Europe (n=1622)) and experimental (online study (n=150)) research designs have been carried out with consumers as well as communicators in the food chain.

The first objective was to explore how social media can contribute to the communication of food risks and benefits according to stakeholders and experts in the food chain. By identifying the strengths, weaknesses, opportunities and threats of social media in food risk and benefit communication, more can be learned about its future role. An additional strategic orientation round allowed to develop practical strategic objectives. Results indicated that opportunities such as crisis communication or creating communities could be captured through the strengths of social media including speed, accessibility and interaction. Threats such as emotional behaviour, information overload and the preference for traditional media are triggered by the lack of a filter and a low trust in the source. Where both stakeholders and experts valued social media as a useful communication tool, a different level of importance was given to the available opportunities, probably arising from different goals.



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The second objective focused on the role social media for individuals who are not inclined to seek information themselves. Although not looking, individuals can still discover information through their surroundings and popular social media applications such as Facebook and Twitter are taking a prominent place in many individuals' social network. Social media's role for incidental information acquisition about food risks and benefits was therefore assessed and differences between social media applications were analysed. A consumer segmentation approach was used to determine consumer interest in social media to obtain information about the risks of pesticide residues on fresh vegetables. The segments with a higher interest in social media were relatively younger participants and were more familiar with social media tools. Overall, participants evaluated Wikipedia highest and Facebook and Twitter lowest with respect to channel usefulness. The findings of this study support the premise that social media applications present communicators with novel and powerful ways to reach both interested and uninterested consumers.

The third objective was to identify how individuals, familiar with social media, position it as a channel to seek food risk information. Which role can social media play besides more common information channels such as traditional and online media and should communicators reallocate their attention to social media? Based on a pan-European online survey, participants were segmented on their inclination to search additional information about the risks of fresh vegetables on different channels including social media applications, traditional and online media channels. The results indicated that social media can act as a complementary information channel, but is not seen as a substitute for traditional or online media by the participants. Individuals that showed an interest to seek information about food risks on social media applications revealed an increased level of information need and affective response. The segment with interested participants contained relatively younger and more Southern European participants.

The fourth and last objective focused on the highest level of consumer engagement: public participation. As social media allows users to interact with their environment, a major challenge lies in measuring and monitoring the impact of this process. By using the VIZZATA<sup>TM</sup> online software, the fourth study explored the validity of a behavioural measure of deliberation in an online environment. Online deliberation about the risks and benefits related to red meat was operationalized as a personal metric based on four activities: the number of questions asked, number of comments left, number of hyperlinks clicked and time spent on the study. The findings showed that active deliberation was positively correlated with information recall but was avoided when information was perceived as too complex.





# Samenvatting

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Succesvolle communicatie over de risico's en voordelen van voeding is tot op heden een belangrijk domein in onderzoek. Goede communicatie probeert de verschillen tussen wetenschappers, beleidmakers, industrie en consumenten te overbruggen. De komst van web 2.0 en de groei van sociale media hebben gezorgd voor een verschuiving in de informatiestroom en de hoeveelheid aanwezige informatie en vereist daarom een vernieuwde visie op de aanbevolen richtlijnen bij communicatie. Sociale media is de verzamelnaam voor online applicaties die het gebruikers mogelijk maken om informatie online te genereren en te delen. Voorbeelden hiervan zijn sociale netwerksites, video- en foto-sharing websites, blogs en microblogs. Er is geen filter met betrekking tot de toegang tot sociale media en zeer weinig belemmeringen om gebruikers te stoppen met het publiceren van niet-geverifieerde informatie. Deze evoluties vormen de basis voor zowel de meest interessante kansen als grootste bedreigingen van sociale media. Waar communicatoren een extra kanaal hebben gekregen om consumenten te bereiken, hebben consumenten nu de gelegenheid om actiever deel te nemen aan het communicatieproces. Hierdoor zijn nieuwe vormen van publieke betrokkenheid op de voorgrond getreden, gaande van het passief ontvangen van informatie uit een sociale netwerkgeving, tot het actief nastreven van interactie met diegenen verantwoordelijk voor communicatie over voeding.

De algemene doelstelling van dit proefschrift was om een beter inzicht te verkrijgen in de rol van sociale media bij de communicatie over voeding gerelateerde risico's en voordelen. Dit onderzoek is gebaseerd op gegevens die verzameld zijn in vier opeenvolgende en onafhankelijke studies. Zowel kwalitatieve (Diepte interviews (n=71)), kwantitatieve (enquêtes in Vlaanderen (n=497) en Europa (n=1622)) als experimentele (online studie (n=150)) studies zijn uitgevoerd met zowel consumenten als diegenen verantwoordelijk voor de communicatie in de voedingsketen.

De eerste doelstelling was om te onderzoeken op welke manier sociale media kan bijdragen tot de communicatie over de risico's en voordelen van voeding volgens de experten en stakeholders verantwoordelijk voor de communicatie in de voedingsketen. Door het identificeren van de sterktes, zwaktes, kansen en bedreigingen van sociale media bij de communicatie rond voeding, kan er meer inzicht verworven worden over de toekomstige rol. De resultaten toonden aan dat opportuniteiten zoals crisiscommunicatie en het creëren van gemeenschappen gevormd worden door de sterktes van sociale media zoals snelheid, toegankelijkheid en interactie. Bedreigingen zoals emotioneel gedrag, een overvloed van informatie en de voorkeur voor traditionele media worden veroorzaakt door het ontbreken van een filter en een zwak vertrouwen in de informatiebron. Hoewel beide de stakeholders als de experten sociale media beoordeelden als een nuttig communicatiemiddel, was er

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een verschillende ranking in de mogelijke opportuniteiten. Dit was mogelijk het gevolg van verschillende doelstellingen bij de communicatie.

De tweede doelstelling was gericht op de rol van sociale media bij individu's die niet de intentie hebben om zelf actief informatie te zoeken. Hoewel deze personen niet actief op zoek zijn, kunnen ze toch informatie ontdekken via hun omgeving. Populaire sociale mediakanalen zoals Facebook en Twitter nemen tegenwoordig een prominente plaats in het sociale netwerk van vele individuen. De rol van sociale media voor het ontvangen van informatie in het kader van de risico's en voordelen van voeding werd daarom onderzocht en de verschillen tussen applicaties werden vergeleken. Een segmentatie analyse werd gebruikt om de interesse van consumenten in informatie over de residuen van pesticiden op verse groenten te vergelijken. De segmenten met een hogere interesse in sociale media waren relatief jonger en beter vertrouwd met sociale media applicaties. In het algemeen werd Wikipedia het beste geëvalueerd door de verschillende deelnemers en Facebook en Twitter het slechtste. De resultaten van deze studie ondersteunen het uitgangspunt dat sociale media applicaties een toegevoegde waarde zijn voor de communicatie rond voeding om zowel geïnteresseerde als ongeïnteresseerde consumenten te bereiken.

De derde doelstelling was het identificeren hoe consumenten sociale media positioneren als een kanaal om actief informatie te zoeken. Welke rol kan sociale media spelen naast meer gebruikelijke informatiekkanalen zoals online en traditionele media en moeten communicatoren hun aandacht herverdelen naar sociale media? De deelnemers werden gesegmenteerd op hun neiging om aanvullende informatie te zoeken over de risico's van verse groenten op verschillende kanalen, waaronder sociale media applicaties, traditionele en online media. De resultaten gaven aan dat sociale media applicaties werd gezien als aanvullend kanaal, maar niet als vervanging voor traditionele en online media. Consumenten met een hogere emotionele reactie en die het belangrijk vonden om geïnformeerd te worden, hebben een grotere neiging om sociale media te gebruiken. Het segment met geïnteresseerde consumenten bevatte vooral jongere, Zuid-Europese deelnemers.

De vierde en laatste doelstelling was gericht op de actieve deelname in het communicatieproces. Sociale media laat gebruikers toe om actief interactie na te streven met diegenen verantwoordelijk voor communicatie en de uitdaging schuilt in het meten en monitoren van de impact van dit proces. Door gebruik te maken van de online VIZZATA<sup>TM</sup> software, onderzocht de vierde studie de validiteit van een gedragsmaat van deliberatie in een online omgeving. De deliberatie van consumenten over de risico's en voordelen van rood vlees werd geoperationaliseerd als een persoonlijke maat gebaseerd op vier activiteiten: het aantal vragen gesteld, het aantal opmerkingen gemaakt, het

aantal hyperlinks aangeduid en de algemene tijd gespendeerd aan de studie. De resultaten toonden aan dat een actief overleg positief gecorreleerd was met het herinneren van informatie op een later tijdstip maar dat deliberatie vermeden werd door consumenten wanneer de informatie gezien werd als te complex.





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# Curriculum Vitae

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Pieter Rutsaert (° Leuven, April 8, 1984) graduated in 2009 as Bio-engineer in Tropical Natural Resources Management with distinction at the University of Leuven. In the context of his master thesis in 2008, he did an internship of four months in Saint-Louis, Senegal. This initiated a successful on-going collaboration with AfricaRice and the pioneering work on value chains and consumer behaviour has led to various experimental studies throughout Africa. This work has been awarded with the best paper award by the Africa Rice Congress in 2010 and the Ted Schultz award by the International Association of Agricultural Economists in 2012. In September 2009, he joined the Department of Agricultural Economics at Ghent University as a fulltime doctoral researcher on the European Seventh Framework project FoodRisC (2010-2013). The aim of the FoodRisC project was to map out the networks and information sources contributing to food risk and benefit communication. Pieter has a background in agricultural economics and consumer behaviour, and specific expertise in experimental auctions, food risk communication and social media. Pieter is author or co-author of various scientific publications in peer-reviewed journals and presented his results at several national and international conferences.

### Personal information

Name	Pieter Rutsaert
Nationality	Belgian
Date of birth	8 April 1984
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### Education

2002 – 2009: University

- 2008
  - Internship 4 months at AfricaRice ([www.africarice.org](http://www.africarice.org)) , Senegal
- 2007-2009
  - Degree Agricultural Economics – Tropical Agriculture (cum laude)
  - Thesis Willingness to pay for quality rice in the Senegal River Valley
  - Institution University of Leuven – Bioscience engineering
- 2002-2007
  - Degree Bachelor of Bioscience Engineering
  - Institution University of Leuven – Bioscience engineering

1996-2002: Secondary

- Degree Science-Mathematics
- Institution Monfortcollege Rotselaar

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## Training and courses followed

19th Seminar of the ENLP (European Nutrition Leadership Program) on leadership and effective communication. Luxembourg, 17 – 25 April 2013.

Doctoral Schools: Workshop Creative thinking. Ghent, Belgium. 7 – 9 December, 2011.

FoodRisC: Workshop NVivo. Ghent, Belgium, 1 – 3 February, 2011.

Doctoral Schools: English writing and presentation skills. Ghent, Belgium. January, 2011

Doctoral Schools: Workshop personal effectiveness. Ghent, Belgium. November, 2010.

## Publications (Academic A1 journals)

Verbeke, W., Rutsaert, P., Bonne, K., & Vermeir, I. (2013). Credence quality coordination and consumers' willingness-to-pay for certified halal labelled meat. *Meat Science*, 95(4), 790–797.

Rutsaert, P., Regan, A., Pieniak, Z., McConnon, A., Verbeke, W. (2013). Potential of social media to inform consumers about the risks of pesticide residues. *Food Control*, 34(2), 386-392.

Demont, M., Rutsaert, P., Ndour, M., & Verbeke, W. (2013). Reversing Urban Bias in African Rice Markets: Evidence from Senegal. *World Development*, 45, 63–74.

Rutsaert, P., Regan, A., Pieniak, Z., McConnon, A., Moss, A., Wall, P., Verbeke, W. (2013). The Use of Social Media in Food Risk and Benefit Communication. *Trends in Food Science and Technology*, 30(1), 84–91.

Demont, M., Rutsaert, P., Ndour, M., Verbeke, W., Seck, P.A. & Tollens, E. (2013). “Experimental Auctions, Collective Induction and Choice Shift: Willingness-to-pay for Rice Quality in Senegal.” *European Review of Agricultural Economics*, 40(2), 261–286. **Winning Paper of the Ted Schultz Award at IAAE congress, 2012, and Best Paper Award at Africa Rice Congress, 2010.**

De Steur, H., Gellynck, X., Feng, S.Y., Rutsaert, P., Verbeke, W., 2012. Determinants of willingness-to-pay for GM rice with health benefits in a high-risk region: Evidence from experimental auctions for folate biofortified rice in China. *Food Quality and Preference* 25, 87–94.

Demont, M., Zossou, E., Rutsaert, P., Ndour, M., Van Mele, P. & Verbeke, W. 2012. “Consumer Valuation of Improved Rice Parboiling Technologies in Benin.” *Food Quality and Preference*, 23(1):63–70

## Book chapters

Rutsaert, P., Demont, M. & Verbeke, W. 2013. “Consumer Preferences for Rice in Africa.” *Realizing Africa’s Rice Promise*. Wopereis, M.C.S., Johnson, D.E., Tollens, E., Jalloh, A. & Ahmadi N., eds., Wallingford, UK: CABI Publishing, in press.

## Invited lectures

Rutsaert, P., Verbeke, W. Research on food for health marketing for shaping consumers’ acceptance? *Invited speaker on workshop: Communicating Food for Health Benefits, Tarragona, Spain, 8–9 November, 2012.*

Rutsaert, P., Implementing experimental research in developing countries: A case-study about Senegal. *Invited speaker summer school 'Choice Experiments in Agricultural and Food Economics', KU Leuven, 3 July, 2013.*

Rutsaert, P., The value of social media in communication related to the risks and benefits of food. *Invited speaker on Eighteenth Conference on Food Microbiology, Brussels, Belgium, 12-13 September, 2013.*

### Conference Papers

Demont, M., Rutsaert, P., Ndour, M., Verbeke, W., Seck, P.A. & Tollens, E. "Experimental Auctions, Collective Induction and Choice Shift: Willingness-to-pay for Rice Quality in Senegal." *Twenty-eighth International Conference of Agricultural Economists (ICAE), Foz do Iguaçu, Brazil, 18–24 August 2012.*

Rutsaert, P., Verbeke, W. Can previously made associations prevent social amplification in risk messages? *SRA Europe Annual Meeting 2012, ETH Zurich, Switzerland, 18–20 June 2012.*

Demont, M., Zossou, E., Rutsaert, P., Ndour, M., Van Mele, P. & Verbeke, W. "Willingness to Pay for Enhanced Food Quality: Rice Parboiling in Benin." *Thirteenth EAAE (European Association of Agricultural Economists) Congress, Zurich, Switzerland, 30 August – 2 September 2011.*

Rutsaert, P., Pieniak, Z., Verbeke, W. A SWOT analysis of the use of Social Media for food risk and benefit communication. *20<sup>th</sup> SRA-Europe Meeting, Stuttgart, Germany, 5–8 June 2011.*

Barnett, J., McConnon, A., Rutsaert, P. Developing a framework for conceptualising the communication of food risks and benefits. *20<sup>th</sup> SRA-Europe Meeting, Stuttgart, Germany, 5–8 June 2011.*

Demont, M., Zossou, E., Rutsaert, P., Ndour, M., Van Mele, P. & Verbeke, W. "Consumers' Value of Improved Parboiling in Benin." *Thirteenth Belgian Association of Agricultural Economists (BAAE) PhD Symposium Agricultural and Natural Resource Economics, Brussels, Belgium, 27 April 2011.*

Demont, M., Rutsaert, P., Ndour, M. & Verbeke, W. "Reversing Urban Bias in End-Markets: Competitiveness of Senegal River Valley Rice." *Third International Rice Congress, Hanoi, Vietnam, 8–12 November 2010.*

Demont, M., Rutsaert, P., Ndour, M. & Verbeke, W. "Reversing Urban Bias in End-Markets: Competitiveness of Senegal River Valley Rice." *Tropentag 2010: International Research on Food Security, Natural Resource Management and Rural Development, Zurich, 14–16 September 2010.*

Rutsaert, P., Demont, M., Ndour, M., Verbeke, W., Seck, P.A. & Tollens, E. "Paying for Quality: Private versus Collective Valuation of Senegal River Valley Rice." *Africa Rice Congress 2010, Bamako, Mali, 22–26 March 2010.* Received Best Paper Award.

Rutsaert, P., Demont, M., Ndour, M. & Tollens, E. "Competitive Rivals: Willingness-to-pay for Senegal River Valley versus Imported Rice." *II Workshop on Valuation Methods in Agro-food and Environmental Economics "Experimental Auctions: Theoretical background and empirical applications", Barcelona, 2–3 July 2009.*

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### **Supervision of MSc Students**

Callens, E. 2011-2012. Functional food as halo effect in the case of risk message: Yoghurt as case. Promotor: Prof.dr. ir. Wim Verbeke. Thesis to obtain the degree of Bio-Engineer.

Owusu Wirekoh, G. 2010-2011. Consumer perception of rice in the Gambia and Ghana. Promotor: Prof.dr. ir. Wim Verbeke. Thesis to obtain the degree of Bio-Engineer.

Vandenhecke, K. 2010-2011. The trust of young Flemish mothers in babypowder milk after the Melamine crisis. Promotor: Prof.dr. ir. Wim Verbeke. Thesis to obtain the degree of Bio-Engineer.

