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Louise Manning
LJM Associates Ltd
The Hill, Castle Frome, Ledbury, Herefordshire HR81HL

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Corresponding Author

Louise Manning
LJM Associates Ltd
The Hill,
Castle Frome,
Ledbury,
Herefordshire
HR81HL

E-mail: l.manning@btinternet.com

Abstract

This paper seeks to analyse the development of the use of social media in product recalls and how it can improve risk communication to the general public. Increasingly, social media is playing an important role for consumers when accessing up to date information. The research reviewed how social media has been used to aid risk communication in a case study example and how effectively the risk message can be communicated to a global audience. Product recalls are becoming more complex in a globally integrated food supply chain. Therefore, regulators and individual organisations need to use effective methods of risk communication to disseminate information to all food supply chain stakeholders and especially the general public. Both regulators and food supply chain organisations should consider how these social media tools can be incorporated into their current risk communication systems, customer and consumer interfaces.

Key words: *information, product, recall, food, social, media,*

Introduction

The full significance of a food complaint may initially only be appreciated by certain responsible persons with the knowledge of other related complaints. Effective management of the resultant product recall is not solely a mechanism of timely identification of the problem, the batch of product affected and controlling the logistics of product return and/or disposal, but also retaining public trust and confidence in the type of food product as well as in the regulator, organisation and/or the brand. The arrangements for a product recall should be pre-determined (i.e. planned and documented) so that the most appropriate procedures can be implemented if the situation arises. Individual organisations and indeed supply chains should be capable of putting these procedures into operation at short notice, at any time, inside or outside working hours (IFST, 2007). Indeed it is often a pre-requisite to supply as in the British Retail Consortium (BRC) Global Standard for Food Safety (BRC, 2011). It is accepted practice in the food supply chain that individual organisations routinely test incident management, product withdrawal and recall systems to ensure that they are timely and effective. In the United Kingdom (UK) product withdrawal constitutes removing a food product from the distribution supply chain including retail shelves whereas a product recall denotes a full removal of batch(es) of food from consumers too where they would be required to dispose of, or return a product to a retail outlet.

It is crucial that there are effective product recall communication systems in place. This includes internal communications within the organisation itself and also external communications in terms of press releases, formal statements to consumers or shareholders, advertisements in national and international media and interaction as necessary with other stakeholders (Manning, 2007). Gurau and Serban (2005) argued that a product recall "message" serves two purposes, firstly to provide practical information regarding the defective product and outline the operational process of recalling the product from the market whilst secondly defending the reputation of the affected organisation(s). Even when an organisation has implemented an effective product recall of its defective products, and without injury to consumers, it may still find itself in an inferior competitive position as a result

(Elliott *et al.,* 2002). The aim of this paper is to consider the role that social media has to play in the product recall process and also in risk communication with consumers.

Hierarchy of actors in a food product recall

The food supply chain has seen an increasing trend in globalisation of food sourcing and thus increasingly complex supply chains (Manning and Baines, 2004). This means that an inability to respond to a food emergency could have significant consequences on health and trade in many countries (WHO, 2002). Governments also have a role in facilitating preventative food safety through both voluntary and regulatory mechanisms (WHO, 1996). In the UK, food safety regulation is at the European or "federal" level through the European Food Safety Authority (EFSA) and at local i.e. member state level in the UK through the Food Standards Agency (FSA). The European Centre of Disease Prevention and Control (ECDC) was established in 2005 and its mission is to identify, assess, and communicate current and emerging threats to human health posed by infective disease (ECDC, 2011). The Centre for Disease Control and Prevention (CDC) acts as the United States (US) federal body for developing and applying disease prevention and control, environmental health, and health promotion and health education activities designed to improve the health of the people (CDC, 2011a) the UK equivalent being the Health Protection Agency (HPA). The US Centre for Food Safety and Applied Nutrition (CFSAN) is responsible for promoting and protecting the public's health by ensuring that the nation's food supply is safe, wholesome, and correctly labelled (CFSAN, 2011). These organisations will be involved in any national or international food supply chain recall. The US Food and Drug Administration (FDA) categories of product recall have been defined (Table 1). The Institute of Food Science and Technology (IFST, 2007) defined the key classifications of a recall within the UK legislative framework (Table 2). It should be noted that the FDA definition of market withdrawal differs from the one stated earlier in the paper, but it is the definition of a withdrawal as being solely from the food supply chain that will be considered in the following discussion. The FDA terms this process as "stock recovery" (Table 1).

Table 1: FDA categories for product recalls (Source: FDA, 2011)

Recall	Class I recall	Class II recall	Class III recall	Market withdrawal	Stock recovery
Recalls are actions taken by a firm to remove a product from the market. Recalls may be conducted on a firm's own initiative, by FDA request, or by FDA order under statutory authority.	A situation in which there is a reasonable probability that the use of or exposure to a product will cause serious adverse health consequences or death.	A situation in which use of or exposure to a product may cause temporary or medically reversible adverse health consequences or where the probability of serious adverse health consequences is remote.	A situation in which use of or exposure to a product is not likely to cause adverse health consequences.	Occurs when a product has a minor violation that would not be subject to FDA legal action. The firm removes the product from the market or corrects the violation.	A firm's removal or correction of a product that has not been marketed or that has not left the direct control of the firm, i.e., the product is located on premises owned by, or under the control of, the firm and no portion of the lot has been released for sale or use.

Table 2: Classifications of recall in the UK (Source: IFST, 2007)

Class I recall	Class II recall	Class III recall
Where the authorities become aware of a hazard or suspected hazard, and information and co-operation from the manufacturer or importer is necessitated;	Where the manufacturer, importer, distributor, retailer or caterer becomes aware of a hazard or suspected hazard;	Where there is no hazard or suspected hazard involved, but there is some circumstance (e.g. substandard quality, mislabelling) which has come to light and which prompts the manufacturer, importer or retailer to decide to withdraw or recall the affected product.

Kash and Darling (1998) citing Fink (1986) categorised a crisis into four phases namely prodromal, acute, chronic and resolution. The authors distinguished between issue analysis i.e. horizon scanning at the prodromal stage for potential issues and then developing an appropriate organisational response, and crisis management. They determined that problems arose in the denial of a crisis either by positive means or through organisational inaction. Therefore, effective lines of communication during the acute and chronic phases are critical in order to deliver effective resolution. Johnson and Peppas (2003) argued that the greater the response time to a critical incident, especially in this environment of instant global communication, the greater the long-term damage to a company's financial security and reputation. They concluded that if decision-makers were unwilling or unable to rapidly address the challenges of product recall, then it will impact on brand equity. The same is true if a product is mistakenly identified as being a potential source of a food safety outbreak as was the case with cucumber and tomatoes which were suggested as a

potential source in the E. coli O104 outbreak in 2011. The first results of a case–control study conducted in Hamburg suggested an association between the occurrence of disease and the consumption of raw tomatoes, cucumber and leaf salad (Frank *et al.,* 2011). This report was issued on the 26th May 2011 on the Eurosurveillance site. The Federal Institute for Risk Assessment (BfR) then recommended that consumers in Germany abstain from eating raw tomatoes, cucumbers and leafy salads as reported on the Eurosurveillance site on the 1st June 2011 (Askar *et al.,* 2011). At this stage there had been 470 cases of haemolytic uraemic syndrome (HUS) identified as being associated with the outbreak. By the 12th June 2011, a total of 3,228 Shiga toxin/verotoxin-producing *Escherichia coli* STEC/VTEC and 781 HUS cases in Germany had been associated with the outbreak (Wadl *et al.,* 2011). On the 11th June 2011 bean sprouts were identified as the possible source of the outbreak in Germany by the BfR (BfR, 2011). Eleven days later the Cellule interrégionale d'épidémiologie (CIRE) Aquitaine, the regional office of the French Institute for Public Health Surveillance, was notified by the Robert Picqué Hospital in Bordeaux, south-west France, of eight cases of haemolytic uraemic syndrome (HUS) or bloody diarrhoea (Gault *et al.,* 2011). A strain of shiga toxin- producing *Escherichia coli* O104:H4 had been isolated from five cases. This strain was genetically related to the strain identified in the recent *E. coli* O104:H4 outbreak in Germany, and shared the same virulence and antimicrobial resistance characteristics. Ultimately it was determined that the EHEC O104:H4 outbreak was most likely to have been caused by fenugreek seeds imported from Egypt via the UK (BfR, 2011). The mixed risk messages as the investigation developed, in part due to the difficulties in tracing product through the catering supply chain led to a collapse in the sales of Spanish tomatoes and lettuce when ultimately the products were believed not to be the source of the pathogen.

deBussy *et al.,* (2000) commented that the introduction of the internet has brought unprecedented change in the ways stakeholders communicate. This means that communication is no longer unidirectional as in the case of a press release, but with social media it can quickly become a conversation in which the organisation(s) at the centre of the product recall may not play a role. Risk

communication by regulators through press releases, technical reports, interviews and websites in the *E. coli* O104:H4 was matched by the communication of outbreak information by private blogs across the world. The detailed information accessible on private blogs as well as the internet based commentary on the perceived efficiency of the investigation into the source of the outbreak and the appropriateness of the risk assessment became a "virtual" conversation with the general public. This was a conversation that was totally outside the control of the regulators and also the commercial stakeholders within the produce supply chains. If regulators and brand holders were not able through either lack of engagement with the social media technology, or through a lack of risk communication strategy, to act quickly enough to join the online conversation there was potential for negative impact on regulators and brand holders,. Ultimately if this occurs during a high profile product recall it could prove irretrievable in terms of consumer trust. White (2009) argued that where issues reported by the media are not tempered by explanation of context from the regulator or supply chain organisations, increasingly negative media frames result. This elevates the salience of the issues and the perceived severity of the crisis by the general public. White (2009) concluded that when issues are not proactively managed, people outside the organisation begin to identify with the side of the issue being presented most robustly in the broadcast media and, in the context of this paper, social media.

The role of the internet in risk communication

The internet provides a platform for an interconnected communication network in the event of a food product recall of food safety investigation. Furthermore, it provides rapid dissemination of information as well as the ability to undertake information exchange between a range of stakeholders. The "viral" nature of Twitter, Facebook, Widgets, and videos means that they can be widely embedded within private sites which in turn generate links that feed back to the regulator's or supply chain organisations' website. Cormode and Krishnamurthy (2008) differentiated between the different paths for disseminating micro and macro content (Figures 1 and 2) and in terms of risk communication a food safety regulator needs to identify which in the array of on-line tools it will use. This will be based on the target audience (content consumer) and the amount of content that the

information provider (regulator or organisation) wants to communicate, or that the users would like to receive on each occasion.

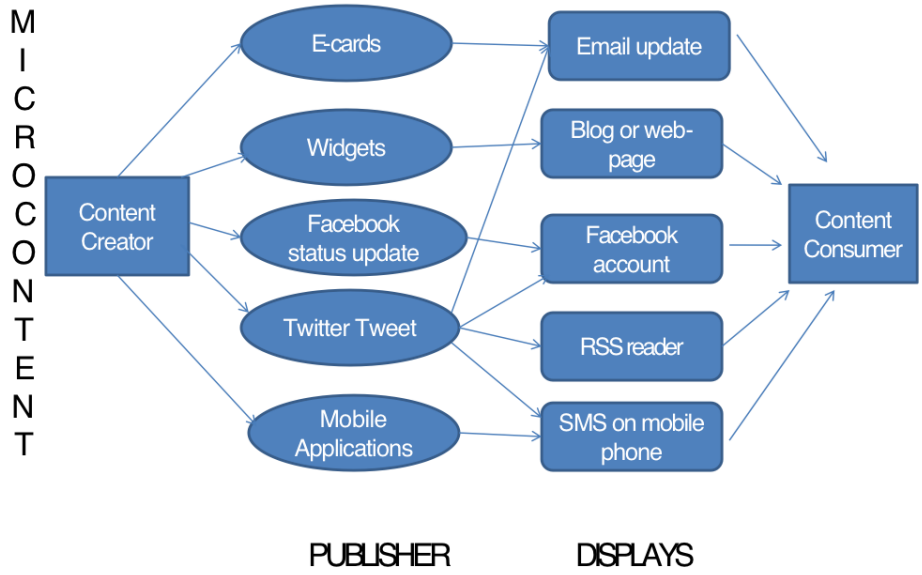

Figure 1: Paths from content creator to consumer using Web 2.0 for micro content (Adapted from Cormode and Krishnamurthy, 2008)

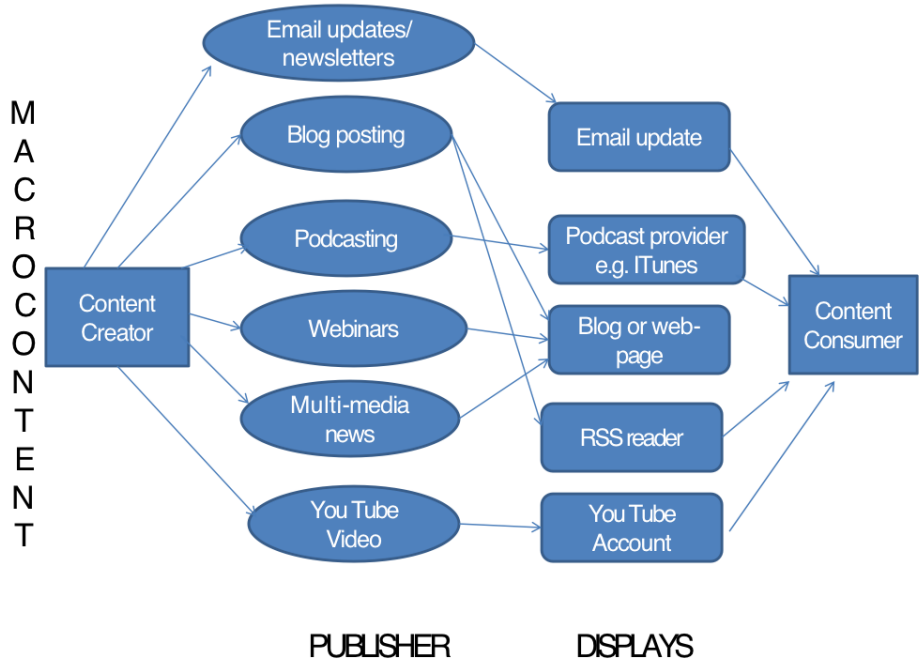

Figure 2: Paths from content creator to consumer using Web 2.0 for macro content (Adapted from Cormode and Krishnamurthy, 2008)

Email updates, and web based pages of text or postings can provide more detailed information whilst short messages could use mediums such as short message service (SMS) texts or Twitter (100-140 characters of text). With Twitter those who subscribe to receiving updates (tweets) will be notified when new information is available. The use of the technology is in its relative infancy outside of the US where there are 1.3 million followers of CDC updates. The UK FSA did show an increase in followers between February 2011 and August 2011 of 91% to 2151 (Twitter, 2011).

In November 2008, a cluster of cases of *Salmonella Typhimurium* were identified in the US (CDC, 2011). The following month there had been 41 cases in seventeen states. On January 9th 2009, Minnesota Department of Health isolated *S. Typhimurium* from an opened container of King Nut peanut butter. On the same day Peanut Corporation of America (PCA) voluntarily stopped production in one of its facilities. Further samples were found to contain *S. Typhimurium* and on January 17th 2009 the CDC and FDA issued advisory information on the consumption of peanut butter. By April 20th 2009, 714 people were formally identified as having been infected in forty six states and it has been suggested that there were nine associated deaths. More than 2800 individual products had been recalled by this time. The challenge for the CDC was how to notify the general public quickly and effectively about this recall. One social media tool used was a "widget" which is a portable "piece of code" automatically updated with the latest information wherever it is located as soon as it changed on the CDC website. The CDC-FDA Peanut Recall widget was designed to disseminate as widely as possible the information on the products that had been recalled in the 2009 Salmonella incident and was viewed 1.8 million times and embedded on over 20,000 sites including private blogging sites (CDC, 2011). This allowed for a much greater cascading of information on the product recall than just having the one interface on the CDC website. The timeline for the PCA recall (Tables 3 and 4) shows the risk communication process undertaken in the six month timescale of the recall.

Table 3: Timeline for Salmonella Typhimurium outbreak linked to peanuts November 2008 – January 2009 (Source: CDC, 2011)

November 10th 2008	Cluster of cases of *S. Typhimurium* noted.
November 24th 2008	CDC PulseNet identifies second multistate cluster of *S. Typhimurium* infections (27 cases in 14 states)
November 25th 2008	Investigation into a cluster of *S. Typhimurium* begins.
December 2nd 2008	Epidemiologic assessment of second *S. Typhimurium* cluster begins (41 cases in 17 states).
December 4th 2008	Both clusters followed with parallel assessments questionnaires also being collated.
December 28th 2008	MN Dept of Health learns of clusters of cases associated with 3 institutions.
January 3rd/4th 2009	First case-control study data collection.
January 9th 2009	Minnesota Dept of Health reports *Salmonella* from opened container of King Nut peanut butter – FDA begins investigation of PCA's facility in Blakely, GA
	PCA voluntarily stopped production of peanut butter and peanut paste at the Blakely, Georgia, facility.
January 10th 2009	King Nut Co. issues recall of peanut butter
January 12th 2009	Results of first case-control study indicate association with consumption of peanut butter**.** Minnesota Dept of Health confirms outbreak strain in opened container of King Nut peanut butter
January 12th 2009	Associated Press (AP) highlight that officials may have found the source of the Salmonella outbreak in a video on You Tube
	Connecticut Dept of Public Health Laboratory isolated outbreak strain of *S.* Typhimurium from an unopened 5-pound container of King Nut creamy peanut butter produced by Peanut Corporation of America (PCA)
January 14th 2009	Kellogg Co. announces hold of Austin & Keebler brands of peanut butter crackers
January 16th 2009	PCA announce voluntary recall of all peanut butter and peanut paste produced in its Blakely facility since July 1, 2008.
	Connecticut Dept. of Health finds outbreak strain in unopened container of King Nut peanut butter – PCA announces recall of peanut butter & paste – Kellogg Co. recalls Austin & Keebler brands of peanut butter crackers
January 17th 2009	CDC & FDA issue advisory information regarding peanut butter & peanut butter containing products
January 17th–19th 2009	Second case-control study data collection
January 18th 2009	Canadian Food Inspection Agency reports *Salmonella* in intact packages of Austin brand peanut butter crackers
January 19th 2009	Results of second case control study indicate association with consumption of peanut butter crackers and peanut butter eaten outside the home
January 20th 2009	PCA issued statement indicating it had filed for Chapter 7 bankruptcy and it was no longer able to communicate with customers regarding recalled products.
January 21st 2009	1st CDC podcast issued
	CDC puts video on You Tube to report that 486 people in US have been confirmed as having the outbreak strain of Salmonella.
January 26th 2009	2nd CDC podcast issued
January 28th 2009	16 clusters of cases, each with at least two patients infected with outbreak strain, were reported in five US States. All clusters in institutional facilities. King Nut was only brand of peanut butter used in the 16 facilities.
	PCA recall expanded to include all peanuts/peanut products processed at the plant since January 1, 2007 including peanut butter, peanut paste, dry- and oil-roasted peanuts, granulated peanuts, and peanut meal. The facility reported that production of all peanut products had stopped.
January 29th 2009	MMWR summarising investigation findings published. Peanut paste from tanker truck reported to be *Salmonella* positive
	AP video on You Tube about PCA recall and comments by Georgia officials
January 30th 2009	CDC Peanut Product Recall Blog started http://archive.hhs.gov/pbrecallblog/2009/01/index.html
January 31st 2009	FDA issues information via YouTube on recall – linked through CDC Blog to CDC Streaming Health on You Tube http://www.youtube.com/cdcstreaminghealth

Table 4: Timeline for Salmonella Typhimurium outbreak linked to peanuts February 2009 - April 2009 (Source: CDC, 2011)

February 2nd 2009	Peanut paste from tanker truck confirmed to be outbreak strain
February 3rd 2009	CDC Webinar for bloggers http://www.cdc.gov/healthmarketing/blog/webinar.html
	AP news item on YouTube states that a peanut processing plant in Texas run by the PCA operated without a license.
February 4tn 2009	Widgets and Twitter links linked through CDC blog – to widen information on recall
February 7th 2009	AP video on YouTube states that the FDA claims that the PCA knowingly sent product that had tested positive for Salmonella
February 10tn 2009	Interview with individuals affected by Salmonella outbreak on You Tube
February 12tn 2009	AP news items on You Tube
February 20tn 2009	CDC Peanut Product Recall Blog ended http://archive.hhs.gov/pbrecallblog/2009/01/index.html
March 18tn 2009	Further CDC podcast issued
March 19tn 2009	ABC News reports on Congress Investigation of PCA via You Tube
April 20tn 2009	714 persons infected with the outbreak strain of *S. Typhimurium* have been reported from 46 states. More than 2800 products recalled. Infection may also have contributed to nine deaths.
April 29tn 2009	Final web update on CDC website

YouTube videos were uploaded within two days of the first recall notice on the 10th January 2009 by the Associated Press; PCA filed for bankruptcy ten days later. The FDA issued their first video on YouTube on 31/01/2009 with a webinar three days later. Widgets and Twitter links through to the CDC blog to widen information on the recall were available on the 4th February 2009. The final update on the CDC website was released on 29th April 2009. This case study demonstrates that the interaction of different types of social media communication offers great potential to increase the reach of risk communication. Risk communication developers and coordinators must recognise that, as has been shown with the 2009 peanut butter recall, social media is a key tool in the event of a product recall due to its "viral" nature and determine how they can update their communication protocols to use the medium effectively.

4. **Conclusion**

Social media is no longer seen as a "virtual" life or community rather an integrated element of societies existing support networks and communities. It is within these networks that individuals socialise, learn, work, and engage as members of personal and professional networks and multiple

interest groups (Eijkman, 2008). As product recalls become increasingly more complex within a globally integrated food supply chain, risk communication needs to be effective and be easily disseminated to a wide audience including food supply chain stakeholders as well as the general public. The use of private risk communication communities assists in the process of quickly cascading risk information to the general public through linking to private website that already have networks in place to regulatory information. Therefore, regulators and organisations who are not using these tools should consider how they can be incorporated effectively into their existing communication networks. The peanut butter recall demonstrates how social media can be integrated effectively into a product recall programme and how messages can be communicated through both public and private platforms. The biggest impact on brand value is if the organisation facing a product recall is outside the media conversation. If regulatory bodies seem aloof from the conversation this will impact on customer confidence in the product, the company and the regulator themselves.

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