Public organizations and social media:
An exploration of the Skellefteå Cryptosporidium Crisis

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Abstract

Events like earthquakes, terrorist attacks, water contamination etc. have drawn an increased attention on the way crisis preparedness can be improved by citizens, authorities and society as a whole. Current research has highlighted the importance of social media in crisis communication and why social media are important, but neglects to describe how social media is used by public organizations during crisis situations. By studying a particular crisis situation in a municipal organization, this thesis investigates how public organizations organize to collect and share information with the use of social media during crisis events. The results show that social media enabled fast response to citizens, due to the coordination and collaboration ability within the municipality. The importance of an existing digital strategy is recognized, for proper managing of social media as response to sudden change.

Keywords: Social Media, Crisis Informatics, crisis, sensing and responding, public sector.

1. Introduction

The nature of crisis is sudden and unpredictable (Waugh & Streib, 2006), therefore communication is a challenge during crisis situations. Civilians as well as governments face communication and collaboration challenges during crisis situations, such as earthquakes (Mark et al., 2012), tsunamis, hurricanes (Goolsby, 2010), 9/11, etc. Survival circumstances seldom stay the same; change is sudden, demanding innovative and fast actions, thus communication and collaboration is paramount in times of crisis, as well-working interaction and coordination are essential for effectiveness, in a chaotic, unstable environment. Emergency and Disaster Management (EDM) organizations are usually a part of the public organizations that constantly face such environments (for a discussion, see Reynolds, 2003; Armstrong, 2005; Harrison, 2007; Palen, Vieweg, Sutton, Liu, & Hughes, 2007; Kyn, 2008; Sutton, Ades, Cooper, Abrams, 2008; Van Leuven, 2009; Hagar, 2010; Goolsby, 2010; Yates, Wagner and Majchrzak, 2010, Mark, Bagdouri, Palen, Martin, Al-Ani & Anderson, 2012; Treem & Leonard, 2012; Morris, Counts, Roseway, Hoff & Schwarz, 2012, and Hagar, 2013).

During crisis, information availability varies more extremely than in normal situations (Yates and Paquette, 2011). Public organizations are helpless to inform citizens when TV and radio stations may be out of service, making mobile phones and internet the only resource to communicate emergencies. Hence new communication technologies play a crucial role to communicate the need for water/food and inform survivals in the affected areas (Armstrong, 2005).

The most popular social media (SM) platforms for online collaboration and information sharing today are; Wiki, Google Docs, YouTube, Flickr, Facebook, and Twitter. SM is a form of digital communication channel, enabled by information technology (IT), that is continuously increasing in importance for crisis response (Landgren, 2007; Wiedenhofer, Reuter, Ley & Pipek, 2012). Recent events, as the Nigerian schoolgirl kidnappings #BringBackOurGirls (Obama, 2014) point that SM enables a call to action by ad-hoc,
community activism. Since SM enables fast response, it proves to be useful for sudden tragedies that evoke converging of different online communities (Sutton et. al, 2008).

Society and the business world have widely adopted SM, almost to a level of addiction, whereas the public sector just slowly realizes the potential advantages of adjusting to the new technologies, brought along by the information age. Digital communication and SM environments have changed the conditions to manage crisis situations, whereas SM enhances citizen engagement and allows citizens to become content generators and spread information. Thus controlling and managing the internal and external information collection and sharing are the main challenges that arise to the leading authority during crisis situation.

Most of the research available today about crisis in relation to SM focuses on either businesses (Coombs, 2007) or how civilians use SM to create awareness of their present state (Keim & Noji, 2011). While a few researchers such as Palen & Liu (2007), Chris Hagar (2010), and Connie White (2011) touch upon the subject of EDM organizations use of SM to improve emergency planning, preparedness and response capabilities, they do not show how public organizations use SM during the crisis situations.

Against this backdrop, the research question is: how do public organizations organize to collect and share information through SM during crisis events? The aim of this study is to explore the strategic communication plans and ways public organizations deal with crisis events enabling an adaptive response to internal and external circumstances. To explore this study I adopt a qualitative case study, investigating the 2011 Skellefteå Cryptosporidium (Crypto) crisis. In more detail I use the sense and respond (S&R) competence framework (Haeckel, 2004) to gain knowledge about the crisis management teams’ adaptability, in line with the fast changing environment.

The remainder of the paper is organized as follows: In section two, SM in crisis situations is described, followed by the S&R theory, presenting a competence framework as the theoretical lens. Further, in section four, the method and data collection is presented. Finally, the paper concludes with the results, and discussion of the implications.

2. Social media in crisis situations

2.1. Crisis situations

Literature shows that managing crisis situations involves novel problems with extended implications; King (2002) and Coombs (1999a) show crisis management as a systematic effort to avoid crisis, or decrease the negative outcomes by effective management. Faulkner (2001, p.136), points out the difference between crisis and disaster, where crisis is self-inflicted through inept management structures and practices or a failure to adapt to change, and disaster is sudden unpredictable catastrophic changes over which we got little control. Selbst (1978) points out the importance of perception management, meaning that misperception can give fruit to crisis. The above examples show that crisis is approached differently by scholars with versatile results. In this paper I present crisis management as a systematic effort to avoid crisis and/or decrease the negative effects.
2.2. Social media
SM is a new technology that brings new possibilities. Online communication by the means of the Internet was available already 1988, by Internet related chat. In 1997, SM has been first used in print by Ted Leonsis, the executive of AOL stating society’s need for SM, “places where they can be entertained, communicate, and participate in a social environment” (Bercovici, 2010, p.1).

Starting from 2001, SM starts taking different shapes and functionalities. Blogging and Wikipedia in 2001, MySpace and Hi5 in 2003, Tagged, Twitter and Facebook in 2004, and many more arise. In comparison with the early stage of the Internet availabilities, the issue today is how to keep up and which information is valid. Kaplan & Haenlein (2010, p. 62) define SM as “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”.

2.3. Social media use during crisis situations
During crisis situations the role of SM can be important from a collaboration and coordination perspective (Armstrong, 2005). Since IT is constantly evolving and crisis still remains, a handful of researchers have shown interest in exploring crisis interconnectedness through SM (Palen & Liu, 2007). Society relies no longer on a single legitimate information source (Sorensen & Sorensen, 2006) and crisis management plans still very often relate to a conventional one-way communication method, therefore the risk for crisis increases, when management structures and practices fail to adapt to change (Haeckel, 1999a).

IT enables newer forms of SM such as mapping and geotagging, also known as location services. Ushahidi, OpenStreetMap, and Google Map Maker are some of the tools used to map crises and disasters (Bauduy, 2010; United Nations Foundation et al, 2011). Mapping tools and collaborative SM resources help crisis responders to inform about hospital location, volunteers’ location, and can ease the coordination of resource distribution (Bauduy, 2010).

SM got the power to provide real time information, facilitate recovery efforts, save lives; however SM also enables the spread of misinformation, rumor and creates panic. During the Boston marathon bombing (Starbird et al., 2014) rumor was spread that a girl got killed during the marathon. Another example is the hurricane Sandy, where fake images were spread about a shark swimming in the front yard (Starbird et al., 2012). Thus, during crisis situations information reliability is critical (Yates & Paquette, 2011). Another challenge is the information overload (Hagar, 2013) generated by the combination of official sources of information and citizen-generated content via SM. Hence EDM organizations role is to actively get involved and choose what to include, and how to coordinate and aggregate the citizen generated content into their official site (Starbird et al., 2012). Alertness is also crucial, since informal channels are fast to fill in gaps when formal channels of information do not answer questions. Thus, strategies are needed for the EDM organizations to respond in time, and to contain crisis by increasing credibility on SM. According to Morris et al. (2012), user biography and re-tweet of the tweet increase credibility, stated in a recent report called “Tweeting is believing? Understanding Microblog Credibility Perceptions”. Other SM issues are the risk to either be too application focused, or too broad disclosing about how technology can influence behaviors (Treem et al., 2012). Considering that citizens and
businesses are constantly updated through SM, it is time for public organizations to respond with a similar attitude and reach strategic advantage. Thus SM use during crisis situations has become an interesting topic for researchers to examine.

Research about crisis and SM use available today varies, focusing mostly on how SM is used in the private sector and during disasters. Qualmans’ (2013) research shows how SM changed the nature of influence, with strong results for Ford and Pepsi that shifted the marketing budget from traditional advertising to SM. Coombs (2007) statement is that there is no perfect list for crisis response strategy, however there is a demand to link crisis situations with response strategies to protect organizational reputations during crisis. Seegers’ (2002) research mostly focuses on best crisis communication practices in general. Whereas Mark et al., (2012), Goosby (2010) and Keim and Noji (2011) are some of the many researchers who research about how SM is used during disaster events, describing how civilians go about to map out their position, how they create awareness, communicate between each other and with EDM organizations. While Palen and Liu (2007), Hagar (2010), and White (2011) touch upon the subject of EDM organizations use of SM to improve emergency planning, preparedness and response capabilities, research lacks on how public organizations organize internally to manage SM in such way that information is coordinated and citizen contact achieved. There is a lack of research about SM use by public organizations and their way of organizing during crisis to reach out to citizens. Hagar (2012) states that during times of crisis, the building of a system to establish information credibility in SM is one way to increase preparedness and response. Thus opening a gap for my contribution by shedding light on how public organizations organize to collect and share information by the means of SM.

3. Sense and Respond theory

For this study, the S&R theory is appropriate, an adaptive theory that can outline crisis demands. In more detail I use the S&R competence framework to investigate the use of SM for the Crypto contaminated water crisis in Skellefteå. S&R is used in this paper as a managerial framework developed by Haeckel (2010), for enterprises facing unpredictable, rapid and discontinuous change. The shift from a ‘make and sell’ to a ‘sense and respond’ institutional framework can best be described by comparing a bus company with a taxi company. To enable enterprises a smooth transition from a make and sell (rigid) way of business to a sense and respond (adaptive) business, Haeckel (2010) focuses on, four areas; purpose, strategy, structure and governance summarized in Figure 1. Taking advantage of the example used earlier, a bus company got pre-established plans, routes, rewards on demand of execution, and timetables; the same is not valid for taxi companies since they depend on customers. Therefore the main difference is that the former is making and selling offers to customers, while the later senses and responds to requests from customers. Thus all four areas play a major role in this paper to understand how Skellefteå municipality managed the transition from a make and sell organization to a sense and respond organization during the Crypto crisis.
Seeger (2002) states that crisis is sudden and unique, therefore planning or following a predetermined course of action, can jeopardize the situation even more, since plans are rigid and crisis unpredictable. The following examples show that S&R has been used by scholars in various different areas: Garreau (2009) refers to “responding” as improvising, Mathiassen, Cho and Nilsson (2008) use the S&R framework to measure dynamic capabilities in two software companies, whereas Menotti (2004) looks at warfare and how to best synchronize.

Changes in the business world increase the demand for engagement between customers and businesses to better understand the customer needs and therefore achieve competitive advantage. The S&R model presents a framework for companies to respond to unanticipated requests and produce what customers ask for (Haeckel, 1999a). Likewise crisis is an unpredictable phenomenon where change is rapid, therefore strategy is needed to respond to sudden change (Haeckel, 1999b). SM plays a crucial role for citizens to communicate their state of health, their needs and position in the affected area (Armstrong, 2005), however to manage a crisis situation it is mandatory that the adequate response is given. Since the S&R model is beneficial for businesses to identify changes in customer needs and business challenges, SM plays a crucial role to bridge the two. Hence I believe it can be applied for the public sector to strategically manage crisis communication by the means of SM. In this study I use the S&R competence framework to observe how public organizations organize to turn in to a S&R mode to collect and share information with the use of SM during the Crypto crisis.

Haeckel’s (2004) S&R four core competences are; 1) knowing earlier, 2) managing by wire, 3) designing a business as a system, and 4) dispatching capabilities from the customer request back (coordination).

Sense and Respond competence framework (Haeckel, 2004).

1 SIDA Loop—Haeckel’s business design. Acronym for “sense, interpret, decide and act”.
2 OODA Loop—Col. John Boyd’s decision making concept. Acronym for “observation, orientation, decision, act”.

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**Figure 1. Haeckel’s’ (2010) Sense & Respond managerial framework.**

<table>
<thead>
<tr>
<th>Area</th>
<th>Make and Sell</th>
<th>Sense and Respond</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Efficiency managerial framework</td>
<td>Adaptive managerial framework</td>
</tr>
<tr>
<td>Purpose</td>
<td>Enterprise centric</td>
<td>Customer centric</td>
</tr>
<tr>
<td>Strategy</td>
<td>Strategic plan OF action</td>
<td>Strategic design FOR action</td>
</tr>
<tr>
<td>Structure</td>
<td>Functional hierarchies of authority</td>
<td>System of modular roles and accountabilities</td>
</tr>
<tr>
<td>Governance</td>
<td>Command and control</td>
<td>Context and coordination</td>
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</tbody>
</table>
called a feedback loop. The main idea is to take informed decisions and act faster than the enemy. Hence, sensing and interpreting rapidly the meaning of what is happening now is the essence to anticipate and take actions to prevent unwanted circumstances. One way is to capture signals that are relevant early and make sense of them faster, by the means of event driven processes, statistical and linguistic analysis. The other way in case of increased uncertainty is to create awareness of what is happening right now, that can be achieved by investing in analysis of existing data, better probes, and pattern recognition. Thus, the decision maker will have to choose from a multiple course of action, where the decision is calculated based on historical effects and observed actions to external events balanced against the contextual framework. This way it is possible to be tactically and intellectually one step ahead.

| Managing by wire | According to Haeckel and Roland (1993), knowing early is achieved by new technologies and techniques (stream computing, event driven processing) that can capture relevant signal and make sense of it faster. Hence, knowing early is useful only for organizations that can act in time appropriately upon that knowledge. Managing by wire is the ability to rapidly adapt during a process; therefore with help of knowing early and technology that translates decisions into operational actions, the speed of the cycle increases. The managerial equivalent is the capability to fly by wire, enabling pilots to rapidly adapt while flying at several times the speed of sound. |
| Designing a business as a system | A new leadership competency where structure is strategy. Methods, principles and tools derived from systems theory along with modularity, result in role and accountability design. Systems thinking can help improve operational problems, and diagnose benefits that are interconnected to how well a business operates as a system. Designing a business as a system means specifying the interactions among organizational capabilities, rather than actions, hence the business is designed from the purpose, and not from capabilities. Placing competent leaders in accountable roles becomes the structure for action, a design that serves as “the central strategy document of the organization” (Haeckel, 2010, p. 31). |
| Dispatching capabilities from the customer request back (coordination) | For an adaptive business system, capabilities must be modular and recombinable, linked together latest possible (coordinated and dispatched) to the customer request back. This should ideally be done with customer focus rather than be decided by |
the executive decision maker in the command chain. The shift is present in regards with the customer facing role as well, since the general management is responsible for this task, and not the sales responsible. Thus, businesses based on customer back design got major responsibilities for the selection, training, and qualification of people on the front line. Value co-creation is in focus, as well as implications such as risk management, identifying and assessing opportunities, general management authority, and accountability.

Table 1. The Sense & Respond adaptive managerial competence framework.

According to Haeckel (2004), being adaptive is the appropriate response to change, however it is harder to achieve than agility, flexibility or rapid response. Therefore with the help of the four competences, organizations can successfully and systematically adapt to unexpected change, and move towards a sense and respond mode.

4. Method

This study applies a qualitative research approach. In more detail I use a case study method, with multiple data collection techniques to create an in-depth focus on the context and complex conditions related to the case being studied (Yin, 2009). Case study methods are often used to conduct explorations (Yin, 1981; 2009), vital for this study in order to explore how public organizations organize to collect and share information with the use of SM during crisis events.

4.1. Case selection

I choose to look at the municipal organization of Skellefteå, Sweden, and their way of organizing and SM use during the Crypto crisis. This case offers opportunities to explore the way public sectors organize during crisis situations, and how SM can be used in these situations. The Crypto crisis broke out during the spring of 2011 and has shaken up civilians’ way of life drastically. The water was contaminated and hindered the lifestyle that civilians were accustomed to. By the municipalities attentive sensing and continuous updating through SM, information management was maintained during the crisis. Water got supplied to institutions and citizens remained in Skellefteå and adapted to the ‘boiling the water’ lifestyle.

The Crypto case is interesting since there is a significant increase in SM communication during the event. The case is favorable from accessibility aspects as well; mainly since Skellefteå is the neighbor municipality, that several articles were published about the crisis event, and that the crisis management team was open for further discussions in regards with the crisis situation.
4.2. Data collection

Since good case studies benefit from having multiple sources of evidence (Yin, 2009), I used documents, interviews and archival records (SM logs) as data sources.

First, as documents I have made use of four reports that I retrieved from the internet, with abundant details about the Crypto crisis event. Since Skellefteå is one of the most well developed municipalities in Sweden in regard to use of electronic documents, applications, etc, I found myself most fortunate to take advantage of their reports, and gain insight about how the Crypto crisis developed. Information and data are recurrent in all four PDF files. The reports were written by the municipality staff, and show a chronological description of the crisis situation, graphs about the increase in contamination over time, images about SM communication, maps about the contamination, communication strategy, and organization strategy. These reports are related to as R1, R2, R3 and R4 throughout the remainder of this paper and are summarized in Table 2.

<table>
<thead>
<tr>
<th>Report</th>
<th>Content</th>
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<tbody>
<tr>
<td>R1</td>
<td>Structure and framework of the communication strategy</td>
</tr>
<tr>
<td>R2</td>
<td>Near, easy and open is the mindset that the information age demands</td>
</tr>
<tr>
<td>R3</td>
<td>The Crypto case with focus on SM</td>
</tr>
<tr>
<td>R4</td>
<td>The way Skellefteå handled the transition from crisis to control</td>
</tr>
</tbody>
</table>

Table 2. Documents retrieved from the internet concerning the Crypto crisis 2011.

Second, I prepared an interview guide see Appendix A, with questions based on different themes; starting by general questions, and continuing to specific questions focusing to create awareness about context, technology in use, and the crisis development. By getting in touch with one of the authors of the reports, I managed to get in contact with four persons from the crisis management team for interview purposes. Two were handling SM communication issues and the other two organizational concerns. The four interviews were held in person, all were held in Swedish, and lasted approximately one hour. The interview guide was followed during each interview. I started by presenting myself and asking for the respondents’ approval to record the interview, followed by their consent and a short introduction of who they were and what role they played during the crisis event. To ensure that I understood the respondents correctly, I added follow-up questions based on their answers. I audio recorded the interviews and have partially transcribed them afterwards, whereas certain sections were translated for the purpose of improving the case study credibility. For confidentiality issues the members asked to be kept anonymous, therefore during the analysis I relate to them as respondent A, B, C, and D. The crisis management team is a team of ten people, of which six were considered redundant to the case since they did not work with management, strategy, SM or IT issues. The remainder four were the ones I chose since they handled information flow on SM, SM strategy to collect and share information strategically, managing the internal systems, and the strategic and management aspect of the crisis situation. The purpose of the interviews was to deepen the understanding about how the public sector organizes internally to create awareness of what is going on in the society. I also gained knowledge about how they controlled the situation to contain discontent citizens on SM.
Third, I read through and observed SM communication between the municipality and citizens. Facebook and Twitter logs were chosen as they are the easiest to follow, since information is short, easily accessible and public. These two SM platforms were the ones to show a clear information exchange between citizens and the public sector. The time interval for the log observations are from April 19th 2010 until September 19th 2011. Observing the SM communication between citizens and the municipality through a longer period of time shows that data on Twitter is less in amount and much more accessible, thanks to hashtags (#). Whereas data on Facebook is much more in amount and less accessible since it cannot be searched for, therefore all the data had to be processed manually. The main focus in data observation on SM was the way communication was taking place, whether the pattern described in the online documents and the interviews was respected, and how citizens found the public sectors response.

4.3. Data analysis

Since data has been gathered from three different sources I use the S&R competence framework and apply a cross source analysis, where I examine themes, similarities and differences across the available data to map up an objective image of the crisis event. In more detail the online reports are very descriptive of the crisis event from a statistical and organizational aspect, naming the SM channels, the IT tools, the way the crisis management group managed to contain the crisis as fast as possible, the communication strategy behind SM use, and other statistical numbers. The interviews gave an understanding about how the crisis management team has got appointed, how come such a wide range of media is used, the downfalls of the internal communications, and how information was organized so that constant secured information is spread to citizens avoiding misconception by changing the way information is delivered, and deviance in information quality. The remainder of EDM authorities such as healthcare and police has also been mentioned during the interviews, revealing that in this case the municipality was the sole member of the EDM organization to keep citizen contact by the means of SM during the Crypto crisis. SM logs show the way citizens perceived crisis as a circumstance, how they try supporting each other and suggest solutions, the level of information flow between the municipality and citizens, and also the degree citizen’s voice is heard.

During the analysis I first apply the S&R competence framework on each data source separately. I coded characteristics from all four documents that apply to Heackel’s (2004) knowing earlier, managing by wire, designing a business as a system, and dispatching capabilities from the customer request back. I do a similar setup with the interviews and the SM logs as well. As a second step of my analysis I do a cross source analysis and examine themes, similarities and differences across the available data to map up for each capability an objective image of the crisis event.

4.4. Methodological reflections

My data collection went down in three stages; I initially started to review online documents that gave me a general understanding about the Crypto crisis. For the case to gain ground I continued by interviewing those in charge of the crisis management, SM, and organizing.
Placing the two data against each other, I still found the case lacking, since the citizen perspective was not taken in consideration, thus I continued by reviewing Facebook and Twitter logs. By having three different data sources I gained a whole different understanding of the Crypto crisis from the one that I generated initially. Hence different data gathering methods give a strong foundation to this case study.

I believe that the case study could have taken a different path if I would have been able to get in contact with several members of the crisis management team, the citizens and with the two remainder EDM organizations. However, since time and resources were not sufficient, I chose to focus on creating depth about the way the municipality organizes and SM communication. For further research I would include interviews with all EDM organizations; the police and the healthcare, as well as with citizens involved in the Crypto crisis.

5. Findings

In this section I first describe the Crypto crisis and create a general understanding of the events in time. Then I apply the S&R competence framework on the available data source to explore the way EDM organizations in Skellefteå organized to collect and share information by SM during the Crypto crisis.

5.1. The development of the crisis in Skellefteå, and the authorities response

Facebook logs show that citizens of Skellefteå municipality situated in northern Sweden started to show symptoms of Norwalk infection already by late December 2010. By the time of April 2011 the contamination increased drastically and thanks to an attentive nurse it was discovered and reported. Respondent D states:

“In this case it actually was one of the healthcare staff who sent a sample to the laboratory for a Crypto test. So it was almost by accident ... skilled employees who thought a little longer, maybe this is a similar case to what happened in Östersund.” (Östersund is a “neighbor” city that experienced the Crypto parasite contamination in 2010.)

It is known from R2 that the parasite called Cryptosporidium, is transmitted by water and makes citizens sick. The source of the contamination is however still to this day, unknown. With the outburst of the Crypto crisis, posts and comments increased mainly on Facebook, whereas on Twitter not so much. Facebook logs show that turmoil (confusion and agitation) has already started when citizens continued being sick for a longer time without being able to get in contact with the right person that could explain what was happening to them. Therefore when the news was public the pressure for the EDM organizations (municipality, police and healthcare) increased to step up, and get in charge of the situation.

R3 shows that the samples sent by the nurse to the Infectious disease institute started a chain reaction, alerting Skellefteå municipality and regional hospitals. On the same day, April 18th, the municipal director prepares a worst case scenario. In this case according to Respondent D, the collaboration between municipality and hospital was important:
“Depending on the nature of the crisis the municipality’s responsibility is to manage the crisis. In this case the rural council and municipal services are involved; therefore collaboration was very important.”

5.2. The public sectors way of organizing and social media use during the crisis situation

I apply the S&R competence framework throughout the crisis event to observe the public sectors adaptability in regards with internal strategic organizing and their ability to collect and share information with citizens through SM.

5.2.1. Knowing early/sensing and interpreting

It is known from the interviews that Skellefteå municipality at the beginning of 2010 has had a minor flood in the Abborren water tower. Respondent A says: “the precedent year the old water plant got flooded by Skellefteå river”. The water flood accident was not dismissed by the municipality, on the contrary. By September 15th 2010 Skellefteå municipality had a Facebook account up and running as a response for any similar unpredictable accidents. Hence, when the Crypto crisis encountered in April 2011, the municipality was prepared to manage the situation, and SM has had a vital role in managing the crisis (R4). Decisions regarding organizing and SM use were calculated based on the Abborren water tower flood effects, thus adequate measures were taken by the municipality to maintain crisis. R4 shows that data and knowledge has been collected from Östersund, a city that has dealt with a similar Crypto crisis, VAKA’s (the national water disaster group in Sweden) expert knowledge and equipment, precedent crisis situations, UV plants, reconciliation routines and organizational strategies. From the Facebook logs it is visible that even citizens tried to contribute by sharing their experience and collaborating with the municipality by filling out surveys and creating awareness of the Crypto spreading, and effect. Figure 2 shows a Facebook comment where a citizen questions the municipality and lifts forth the Östersund Crypto crisis, suggesting the implementation of a UV plant.

![Image: Facebook log.](image)

Figure 2. Facebook log.

The interviews revealed that an overall awareness has been achieved within the municipality by Flexite, the municipality intranet system, and a system called WIS where
information is shared between the EDM organizations. The strategy was to be “transparent and open” inform and be perseverant, continues Respondent D:

“We used Östersunds’ knowledge first before we had ourselves an idea about the crisis. We called Östersund directly, asked for help and placed out the common questions and answers on the networks.” Ensuring the citizens by stating:

“We have parasites in the water but we have an eye on the situation and we are doing everything we can to get fresh water as soon as possible.”

The techniques about how to organize and the event driven process captured relevant signals, therefore the municipality could make sense of it faster. R4 shows that the municipality also hired an external communication company beside the customer service available, for brand management, to collect, analyze and manage data. R2, R3, interviews and Facebook logs show that information was shared with citizens through SM, to boil the water; therefore the spreading of the Crypto parasite contamination has been contained. Figure 3 shows a graph from R3 with the contamination fluctuation and result from boiling the water.

![Figure 3. Statistical graph from R3.](image)

The meaning of knowing early is to take informed decisions and act faster than the enemy. Since the municipality has collected abundant information and knowledge about the Crypto parasite, both R3 and the interviews show that they tried to collaborate closely with the healthcare system and organized the private sector in such way that information was shared through all available media with citizens. R3 shows that help was provided by supplying water to institutions such as; kindergartens, schools, and old folks home. In regard with SM communication the municipality has developed a communication strategy about how information ought to be spread and how to maintain citizens calm, considering the circumstances. Such examples are seen in the Facebook logs, where information is carefully explained about how to proceed when using water.

Preparedness to be alert and act fast, are characteristics well known from the S&R theory. By being flexible and consistent in sharing information, it was possible for Skellefteå municipality to be tactically and intellectually one step ahead.

### 5.2.2 Managing by wire

Since the municipality has captured and analyzed data, their skills to manage the Crypto crisis online show an ability to rapidly adapt during a process. Observing the way they go about at an initial stage of the crisis creating awareness, shows that ‘knowing early’ and use of SM increase the speed of the responding cycle. The strategy to manage the Crypto crisis is
based on structure, first ensuring the necessary resources, and later adapting to what the circumstances demand. It is known from the interviews that the strategy often can change from hour to hour expressed by Respondent C:

“We have a sort of start strategy that is quite similar, to eliminate worries about what to do now, so that we can somehow have a kick start to this crisis management organization. When we start to get a grip of the situation, we can decide if this kind of event can be handled from hour by hour or day by day.”

The difference between the two internal IT systems that were used during the Crypto crisis is described foremost in R3. WIS was used to share information between the EDM organizations, however from the interviews it is known that it has not been used for collaboration purposes. Whereas Flexite is the intranet system of the municipality, that has been primarily used to enable information consistency and to enable employees collaboration within Skellefteå municipality. When an overall awareness has been created about the extent of the crisis, a press release was made; newsletters were sent out, emails and information made available on Skellefteå’s web, Facebook, and Twitter. Figure 4 shows the accessibility options for citizens to get in touch with the municipality through several channels. All information was kept constant through all channels by the municipality, by doing so the risk for misconception decreased.

Figure 4. Contact and Response image from R4

Facebook logs show that citizens get involved in finding out how the Crypto contamination started, and also to map out the Crypto spread with an online mapping tool.

Figure 5. Facebook log
In R3 it says that Crypto has not been found in the drinking water according to respondent C, they found it “in the stomach, feces, sewage and treatment plant” says Respondent C. The first citizen in Figure 5 shows serious concerns about sewage being dumped in the river from where the drinking water is taken. Another citizen wants to report symptoms detected before April 1st, which is impossible since the survey got a start day from the 1st of April. There are several other citizens who raise their voice about rumors they have heard, some are irritated by the fact that the survey starts from a certain point, others get frustrated that information is not constant. Whereas the municipality explains that the meaning with the survey is to delimitate the contamination area. The third citizen adds a link where citizens can check the area and therefore avoid conflict raised about the time issue of the contamination.

The interviews reveal that not all EDM organizations were involved in managing the crisis, since the municipalities rescue unit, healthcare and police are separate authorities. On Twitter however there is a post where help is offered from the “doctor”.

Respondent D states: “We will work during crisis as we work every day... consistently. The difference is that we report differently. During crisis we report in both WIS, and Flexite. When there is no crisis, the reports are done only in Flexite.”

By the means of WIS, information has been made available to the healthcare system; however there has not been any sign of collaboration with the police during the crisis. According to Respondent C and D a municipal crisis is often under the control of the political leadership, committees, and officers “they do not involve the police or healthcare”, however in times of extreme crisis WIS and RAKEL are the means to communicate between the EDM organizations. In this case fast action was demanded and a “to do list” had to be made according to Respondent D: “There is a crisis management team that handles questions about how to act. Political decisions had to be taken; we had to contact the right politicians to decide on the UV facility.”

Citizens were able to get hold of information not only through Skellefteås’ web page but at the arranged press release, all media including Norran the local newspaper, television and radio, newsletters, and SM channels also. R1, R3, and R4 show that with the help of an already existing crisis plan and the strategy for SM management the municipality knew the actors involved, and roles of each actor they needed to collaborate with. Respondent A states: “We have had a mindset about how to deal with social media, and there was a clear strategy ..... Everyone knew their role.”

5.2.3. Designing a business as a system

There is a lot of emphasis on structure and order in R1, R2, R3, and R4, proving to be the basis for the crisis management strategy. R1 is a type of report where information is structured based on achieving established aims and is the ground of the communication strategy. Whereas R2 describes the channels and technology used to reach out and allow
citizens to connect. A few of such channels and technologies are; external webpage, spokesperson, media and press conference, Facebook, Twitter, Norran.se, customer service, telephone. A decentralized approach was decided by the municipal director and a crisis management team was appointed. According to the reports the team was put together by the; 1) Municipal Director, 2) Crisis Coordinator, 3) Cable Secretary, 4) Water/Waste Manager, 5) Water/Waste Section Chief, 6) Head of Public Services, 7) Chief of Information, 8) Information Press Officer, 9) Information Officer from the technical office, and 10) 2 Environmental Inspectors. Respondent B affirms the decentralized approach and states the rareness of finding a crisis expert, thus competent leaders were appointed from each area involved;

“The municipal director has appointed the crisis management team. It was not based on education... they would do what they do best.”

The structure for organizing and delimiting which technology should fulfill what role in collecting and sharing information between the municipality and citizens is foremost written about in R2. Figure 7 represents the structure for the municipality to organize information, publishing information first on the external webpage. According to the interviews the external webpage is the main source to keep information consistency, and is the information source for SM, customer service and newspaper publications.

**Princip för informationsspridning**

![Princip för informationsspridning](image)

Figure 7. Information spreading.

It’s known from R3 that clear roles have been set, the decision makers were in a high degree involved in the execution of the established strategies and plans. R1 is the initial document describing the structure about how information and communication ought to take place. The communication strategy on how to post information and how to reply to citizens’ posts on SM is summarized in Figure 8, however according to Respondent A it became tacit:

“...that is something you got in the back of your mind! It sits pretty much in the spinal cord.”
5.2.4. Dispatching capabilities from the customer request back

According to the interviews information posted on SM came mostly from the secured data, published on the web. Consistency in information made it possible that everybody is coordinated and updated equally regarding changes in crisis. A few posts on Facebook, show citizens expressing frustration about the situation and the information liability, not getting answers, and not knowing what to do, due to difference in information from one platform to the other. Other citizens’ raise concerns about their symptoms, pets, or that sewage is dumped in the Skellefteå River. The majority of citizens on Facebook either encouraged the municipality staff for a job well done, or raised questions like: “Why should we pay for the water if it is bad?”, “Who will pay my sick leave?”, “Why is the survey from the 1st of April?”, and “Why are you not answering my questions?”. Some questions were answered others delayed and some disregarded, which has driven citizens to help each other. Respondent A states that: “We haven’t answered medical questions, that was also evident in the crisis; that healthcare issues are dealt by the hospital. Because it is not our ..... We’ll answer to only what we know.”

The hospital has had a representative at the press release, however according to Respondent A it is unknown in what degree the healthcare or police has participated through SM:

“I do not actually know if they were on the social media or not, but when we got such questions we advised citizens to their site or our usual question and answers on www.Skellefteå.se. We didn’t want to risk posting bad information; therefore we haven’t taken the roles of others.”
By April 21st, only 6 days after the start, with the clear instructions of boiling the water and being careful to dry everything before use, the Crypto contamination started to decrease. Updates on SM were constant according to interviews, Facebook logs and R3. The traffic on Facebook increased with 736% during the Crypto crisis, and on the external website from 700 visitors it increased to 17101 visitors, whereas the Facebook logs show clear involvement from both citizens and the municipality.

R4 shows that constant investigation, repairs, maintenance and supply assurance has been done by other parties meanwhile information was spread and the trust of the citizens earned. Reassuring citizens that things are under control and that the water will be drinkable again.

With clear roles, constant updates and presence on several channels of SM, after 140 days on September 6th 2011 the water has been declared Crypto free. During this time 3 UV plants have been installed, the pipes got flushed at several occasions and surveys filled out by 12368 persons of whom 6167 had been contaminated.

This event has been declared a success event and crisis studies have been made, as well as an invitation has been sent out to citizens on June 13th 2012 for a post crisis focus group, to help improve crisis preparedness in Skellefteå municipality. Respondent D states:

“There is definitely space for development, coming through as one unit during crisis when involving multiple authorities.... As a citizen you want to be able to turn to one place, and get all the answers ... and in that area there is much to do.”

6. Discussion

The three different data gathering methods; reports, followed by interviews, and SM logs, enabled this thesis to gain solid grounds on how the public sector takes advantage of SM during the outbreak of the Crypto crisis. The study shows the vital role SM gets in crisis management, in regards to collecting and sharing information that generate engagement of and value for both citizens and the public sector.

6.1 Public organizations use of SM in crisis

Due to the fast changing nature of crisis (Waugh et al., 2006), information, reliability, and accessibility is questionable. To contain crisis, citizens’ needs and contribution are important (see Palen et al., 2007; Liu et al., 2010). Skellefteå municipality achieved tactical advantage by recognizing that citizens rely on SM (Pauchant et al., 1993). SM is seen as the technology that connects people and enables fast, response (see Landgren, 2007; Wiedenhoefer et al., 2012), this can be easily seen from the high traffic increase on Facebook with 736% during the Crypto crisis, and on the external website from 700 visitors it increased to 17101 visitors.

There has been use of SM in Skellefteå since the year before, therefore objectives, tactics, and principles were set by the municipality on how to communicate with citizens, and how to manage information so that crisis can be maintained.

Interaction with citizens through SM has been prioritized compared to the internal communication regarding information sharing. The municipality staff responding to the citizen comments on SM have at times been too fast at responding, therefore some information came in fragments, while information streaming in from the citizens have
seldom been shared between the parties involved in the crisis management. With other words, the IT resources available for internal communication have not been synchronized with the public one, and it led to a lack of collaboration between units. This also resulted in an information shift on different channels, confusing citizens (King, 2002; Coombs, 1999b).

The absence of the healthcare representatives on SM has also caused disruption. As for acquiring information/knowledge of the contamination, symptoms, measures to take, and update of the situation citizens needed to contact two different EDM authorities, of which only the municipality was present on SM. Considering that the municipality could not answer questions related to healthcare issues, the absence of the healthcare representatives on SM shows lack of coordination between the authorities. Citizens were often concerned about their symptoms and the measures that need to be taken, their pets, and also how to adjust to a life that no longer is the one they were accustomed with. Since answers were provided solely by the municipality staff, these were not sufficient and therefore frustration and complaints were recurrent.

SM proved after all to be an asset for interaction, and support to citizens. The municipality proved to have a rather citizen centric approach, such as: updating information on SM and their webpage continuously, the flexible office hours and the premade communication strategy about how to respond on SM that proved to be functioning. Since the public responded, by being reflexive, getting involved and helping each other, as well as collaborating with the municipality by filling in surveys and following instructions, a certain value co-creation has been achieved between the municipality and the citizens through SM.

6.2 Public organizations way of internal organizing
From S&R aspect the case study shows that measures were taken as a response, to the increasing number of contaminated citizens. The fast pace of communication, led to partial collaboration between the municipality and healthcare, two separate authorities. Besides the press release, the healthcare representatives have not been present on SM, therefore information has been mainly spread by Skellefteå municipalities’ employees. The lack of involvement from the healthcare system and police has had its negative effects, mainly since citizens did not get answers to their concerns, and transportation of fresh water to the facilities in need took longer time by using only the manpower of the municipality.

Crisis often does not merely come as a shock to citizens but to authority as well. Lacking structure, strategy, knowledge/information sharing, communication, collaboration, coordination and IT resources, can often lead organizations to end up with an internal crisis upon the crisis just happening. The case study shows that the ability of a fast response to organize within the municipality was due to the pre-crisis preparedness, the ability to strategically appoint clear and accountable roles to each person within the crisis management team (Haeckel, 1999a), and available IT resources (Earl, 1989).

The municipalities’ strategy to tackle the Crypto crisis rests on structure (Haeckel, 1999a), starting with assessment between the event and framework, recognizing the nature of the crisis, and identifying the measures necessary to manage such crisis. Whereas continued by appointing competent leaders with accountable roles (Haeckel, 1999b), from the affected areas. It is by such means that the crisis management team was appointed and therefore
several S&R competencies were fulfilled since the decision takers were involved during each step of the crisis.

Based on openness, collaboration, flexibility, reflexivity and fast response, all have been achieved with great results except collaboration. Since crisis management by Skellefteå municipality has proven to be a success story, the improvement that needs to be done is to better detect, spread and synchronize information within the public sector to later share with citizens.

6.3 Implications
My study involves several implications worthy of future study. First, it would be valuable to further examine each authority from the EDM organizations, and how collaboration is maintained between each other. This study suggests that there is lack of collaboration between different authorities during the Crypto crisis. The reason for this ideology, it seems, is that each authority has got a central unit across the country; therefore the healthcare system and police authorities do not respond or collaborate with the municipality they are situated in, since they have got orders from each of their headquarters on how to act. Thus it would be helpful to examine how collaboration takes place between different EDM organizations during crisis and in general.

Secondly, an area that deserves attention is the opportunities for the municipality staff for further developing their response skills by SM. The study suggests that information has not circulated at times. The information that has been provided by the citizens on SM has not always reached the one responsible to take action and improve the situation, thus citizens were asked to personally take contact, which did not happen. Hence from a sensing and responding perspective the municipality had its downfalls, resulting in information discrepancy, causing frustration and confusing citizens for a short amount of time.

Strategy showed to be important. The tactical strategy based on structure, clear roles, and fast response on SM has clearly proven good management skills and by the citizens involvement value co-creation is achieved.

For further study the EDM organizations underlying reason for lack of collaboration is an interesting subject to pursue.

7. Conclusion
This report shows that structure is the public sectors strategy for communicating by the means of SM; however the nature of crisis indicates that further research is needed in this area. The Skellefteå Crypto crisis has been maintained thanks to the available IT resources, and the fast sensing and responding ability of the crisis management team. SM logs show the need for the public sector to be online, and that IT plays a decisive role in managing crisis.

The S&R managerial framework shows that public organizations just as businesses are codependent of citizens, therefore flexibility and adaptability is mandatory to handle unpredictable circumstances. In regard with the transition from a make and sell organizational mode, to a sense and respond organizational mode, there is still room for improvement in the area of sensing and responding to requests from customers.
8. References

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Appendix A

Interview guide

Respondent background: job position(description), educational background, work history.

Context

1.) What is your organization’s business model?
2.) What knowledge have you got about crisis?
3.) Have you ever experienced crisis? How many? What type?
4.) What strategies have you got in times of crisis?
5.) Who are the ones in command in times of crisis?
6.) How do you respond to crisis? What is your tactic?
7.) How is the communication between the decision maker and executer?
8.) Which is your primary communication channel?
9.) If your primary communication channel would be eliminated, what do you do?

Technology

1) What tools do you take advantage of during crisis?
2) Do you manage by wire?
3) Which platforms do you use during crisis?
4) Have you got any knowledge of crowdsourcing or crowd mapping? Do you take advantage of such at the moment?
5) Have you ever considered using social media as a platform for systematic coordination of events in times of crisis?
6) Would you use any social media as a platform for crisis?
7) Which are the challenges and opportunities by communicating through social media?

Pre and after crisis communication and management

1.) Have you got any plans to anticipate crisis?
2.) Which are those?
3.) Which is the main communication channel in times of crisis?
4.) Who are the partners you collaborate with?
5.) How do you synchronize data so that multi decision can be made?
6.) Do you rely and take advantage of online data from social media?
7.) How do you decide which data is true or false?
8.) How do you organize collaborations with partners?
9.) Have you got any strategy for systematic coordination of different units?