EmerGent

EMERGENCY MANAGEMENT IN SOCIAL MEDIA GENERATION

Deliverable 2.2   **Impact of social media on Emergency Services and Citizens**

Final

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Glossary

Abbreviation	Expression
A2C	Authorities to Citizen
BBM	BlackBerry Messenger
C2A	Citizens to Authorities
C2C	Citizen to Citizen
CCTV	Closed-Circuit Television
DOW	Description of Work
EmerGent	Emergency Management in Social Media Generation
EMC	Emergency Management Cycle
ES	Emergency Services
GMP	Greater Manchester Police
IA	Impact assessment
IQ	Information Quality
MPS	Metropolitan Police Service
ToC	Theory of Change

1   Introduction

1.1   Abstract

This Deliverable develops and applies the concept of impact assessment based on a Theory of Change model presented in D2.1 [CSJD+14]. This is done by applying it to a particular case study – the 2011 London riots – as an initial iterative example of the use of social media in an emergency. Section 2 sets out the overarching case study methodology for this and subsequent deliverables – a multiple case study approach via Deliverables 2.2, 2.3 and 2.4 as part of which cases are selected to explore, confirm or disprove patterns identified and presented on the basis of initial case studies. Section 3 presents the first case study exemplar conducted as part of Tasks 2.2 and 2.3, focusing on a recent and well-documented emergency in the UK in which social media were used in different ways by citizens and Emergency Services (ES) – the 2011 London riots. It starts with a description of the context and background of the riots, and then presents the findings of a content analysis of primary and secondary evidence relating to the use and impact of social media on citizens and ES during and after the riots. Section 4 draws some initial conclusions from this case study to inform the developing Theory of Change, including our initial hypotheses on the use and impact of social media in emergencies. Finally, section 5 outlines the next steps in the research process – including the focus and rationale of the next round of case studies (flooding) and research instruments developed as part of this initial case study. It also provides an update of the Theory of Change expected impacts and outcomes based on a survey of research partners.

1.2   Purpose of the document

This Deliverable contributes to Objective O1 of EmerGent – Analyze the impact of social media for citizens and for EMS in the whole Emergency Management Cycle (EMC) today and tomorrow. The specific objective of this Deliverable is to develop and update the Theory of Change presented in D2.1 and to carry out an initial case study to research the impact of social media on how ES respond and react in an emergency (Task 2.2) and how citizens use social media in an emergency, how they use it to interact with each other and others, including ES, and what impact this has on them (Task 2.3).

1.3   Target audience

The direct target audience for this Deliverable is the EmerGent project partners. Additional target audiences are ES, researchers in general and those with an interest in this particular case study (the London riots) and in social media use in emergencies in general, as well as the European Commission and other FP7 projects.

2 Methodology

2.1 Introduction

The main objective of this Deliverable and Tasks 2.2 and 2.3 is to validate and refine the concept and methodology developed in Deliverable 2.1 by exploring its application in the context of real world examples of emergencies, focusing on assessing the impacts of social media for both ES and citizens. As noted in Deliverable 2.1, the framework for the EmerGent impact assessment methodology that was developed in Deliverable 2.1 is a 'baseline' framework. The intention is that the framework will evolve dynamically over the life-cycle of the project, and beyond, as EmerGent develops, validates and tests its products and services through further research and through the collaborative involvement of users and other stakeholders as 'co-producers of EmerGent knowledge'.

This Deliverable, D2.2, represents the next stage in this evolutionary process. It uses a real example of an emergency to test the appropriateness and effectiveness of the baseline methodology and to identify ways in which the baseline methodology can be further developed and improved. In particular, it focuses on validating and further developing the 'Theory of Change' model that lies at the heart of the EmerGent impacts assessment concept and methodology. As set out in Deliverable 2.1 [CSJD+14], the key features of the Theory of Change model are:

- the Theory of Change reflects – explicitly and implicitly – the 'vision' of EmerGent, i.e. the presenting 'problem' the project seeks to address; the underlying causes of that problem and the possible solutions that will solve the problem
- the Theory of Change incorporates a set of assumptions – hypotheses – about what kinds of actions are likely to lead to different kinds of changes (outcomes and impacts), i.e. it specifies the causal relationships between actions and outcomes and impacts (doing X will lead to Y which will lead to Z)
- these assumptions are tested as the project moves through its life cycle and implements its planned activities. On the basis of the outcomes of these activities (the changes that result from activities), the assumptions will be accepted, revised or rejected
- the Theory of Change can be expressed operationally in terms of a 'logic of intervention' or a 'logic model'. This specifies: how the vision of EmerGent is translated into project objectives; the ways in which objectives are linked to project activities; the outputs produced as a result of implementing these activities; the outcomes (short term results) that are expected to be realized through applying these outputs; the indicators that are used to measure these outcomes; the means of verification (the tools and data used to collect measurements). The logic model can also specify the expected impacts of EmerGent – the long-term changes that are likely to result from the project's activities.

The overall approach of Work Package 2 and in subsequent deliverables will be to review the initial Theory of Change framework developed in Deliverable 2.1 from three main perspectives:

- conceptual coherence
- structural integrity
- operational effectiveness.

The **conceptual coherence** perspective focuses on assessing whether the impacts assessment concept and methodology is conceptually sound. This means critically assessing and reviewing the theoretical and research basis of the Theory of Change model and how it defines and captures impacts in the light of the diverse range of impacts that can be identified in a real emergency.

The **structural integrity** perspective focuses on assessing whether the concept and methodology can capture and make sense of the two different but inter-related dimensions of impacts that EmerGent needs to work with: the generic dimension (assessing the way social media in general – independently of the EmerGent socio-technical innovations – has a positive or negative impact on ES, citizens and on the EMC and whether or not it enhances safety, speeds up recovery and ultimately saves lives) and the project-specific dimension (an assessment of the extent to which and in what ways planned inputs, outputs and outcomes have been achieved and what the effects and impacts of these are on ES, citizens and on the EMC).

The **operational effectiveness** perspective has a practical focus. It looks in particular at the methods and tools embedded in the concept (and the Theory of Change model) and assesses their efficiency and effectiveness in capturing and meaningfully analyzing data on impacts that are derived from examples of real world emergencies.

The methodology used to carry out the validation and development activity reported on in this Deliverable is based on case study analysis. This is presented below in section 2.2.

2.2 Case study methodology: case study waves (Tasks 2.2 and 2.3)

2.2.1 Why case studies?

The rationale for using case studies and the opportunities they provide for EmerGent reflect a number of features of the case study methodology. Firstly, it allows for more detailed capture of contextual elements. This is relevant for EmerGent since the project works with a wide range of emergency scenarios and situations. As noted in Deliverable 2.1, emergencies can be categorized in diverse ways – by level (from everyday minor events to national and international disasters); by type (natural, technological, social); by stage (from prevention to recovery) and so on. To some extent, every emergency can be seen as unique, but all emergencies share common features. The case study methodology is an effective way of reflecting and combining the unique and the general. Secondly, case studies are an effective methodology for identifying and understanding inter-relationships. The case study approach enables in-depth mapping and assessment of the interaction of different processes and stakeholder relationships. In EmerGent, we are particularly interested in the interactions between different groups – particularly ES and citizens – and how these affect impacts in emergencies, and in how the different stages of the process of emergencies influence impacts. Thirdly, case studies provide evidence on the 'how' of interventions (rather than simply the 'if' or 'what') [Yin94]. This is important for EmerGent because at the heart of the impacts assessment concept and methodology is a Theory of Change model that tries to identify the 'causal relationships' between actions and outcomes. Fourthly, case studies act as 'exemplars' that can be generalized to the domain as a whole, therefore contributing in a practical way to problem-solving [Flyv06]. They work well in 'exploratory' research, in situations where the evidence base is still developing (as in the domain of social media in emergency management). Finally, they provide a richer 'narrative' body of evidence.

The potential challenges for using case studies in EmerGent focus on the perception that descriptive case studies are qualitative and unreliable. Although they can be used as 'exemplars', it is argued that since they typically relate to single projects or events, their results usually cannot be generalized. This is mainly because of potential investigator subjectivity. However, as [Yin95] suggests there are three ways to address this challenge: using multiple sources of evidence, establishing a chain of evidence, and the review of outcomes by key informants. The case methodology study proposed in Deliverable 2.2 incorporates all three of these strategies through the use of multiple methods, triangulation, Theory of Change, key informant interviews and peer review. In addition, the problem of external validity is addressed by the use of a common case study protocol and reporting template which reduces the possible effects of researcher subjectivity.

2.2.2 Case study methodology

The overall methodological approach adopted for the case study analysis in Deliverable 2.2 follows the 'multiple case study' approach developed by [Yin02; Yin13]. This allows exploration of the phenomena under study – the impact of social media in emergencies – through the use of a replication strategy, in which cases are selected to explore and confirm or disprove the patterns identified in the initial cases. According to this model, if all or most of the cases provide similar results, there can be substantial support for the development of a preliminary theory that describes the phenomena [Eise89]. In practice, the case study analysis proceeds as a series of 'waves'. The first wave – the initial case study – is essentially an exploratory or 'scoping' exercise, the objectives of which are: to review the existing knowledge of the domain (as reflected in the results of EmerGent Deliverable 2.1 [CSJD+14]); to clarify outstanding issues in this knowledge; to add further to the knowledge; to validate and further develop the case study methodology itself. This initial case study in this Deliverable will highlight key issues and themes, as well as additional knowledge gaps, that are then subsequently focused on in successive waves of case studies.

This overall approach is implemented through a multi-method design that combines and triangulates:

- A review of relevant documentation about the case
- Interviews with key organizations and stakeholders
- Additional field research, for example field studies and observation of activities in emergency situations (although this will normally only be done in 'live' emergencies).

The case study implementation process is based on three inter-connected elements and stages:

- Logistics
- Data collection
- Analysis and Summary profile.

The **logistics** element incorporates common activities for the case studies, focusing on gathering information on contacts and available data (Data Audit). The **data collection** element sets out procedures and tools for the main data collection activities, and provides standardized templates for the key informant interviews, documentation analysis – including a coding frame for content analysis – and additional field research (e.g. observation template). The a**nalysis and summary** element provides procedures for analyzing and summarizing the data collected.

Each case study addresses a set of common research questions – though the emphasis and context of these questions varies between case studies and different case study 'waves'. These are:

- What types of citizens used social media before/during/after the emergency? (Who did not and why not?)
- How did citizens use social media before/during/after the emergency?
- Which social media platforms were used (at what stage of EMC)?
- What ES were involved in the emergency?
- How did ES use social media during the emergency? (C2A, A2C, mining C2C data)
- Did social media influence ES response to the emergency? In what ways?
- What were the benefits of social media usage for citizens/ES/other?
- What were negative outcomes of social media usage for citizens/ES/other?
- What barriers or issues were experienced by citizens/ES/others?
- What did ES and citizens learn from it? Did the experience lead to changes in how these groups respond to emergencies?
- Has it highlighted any gaps or needs?

The main data analysis method used for analyzing data collected through documentation analysis and key informant interviews is based on content analysis. Technically, this approach uses "a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding" [Stem01]. However, in EmerGent, we extend the unit of analysis beyond the narrow boundary of text, using a broader definition of content analysis as, "any technique for making inferences by objectively and systematically identifying specified characteristics of messages" [Hols69]. This allows us to include types of material other than 'text', for example audio and visual material.

For the London riots case study, the research team identified data sources via a variety of methods, including:

- Key word searches of relevant databases

- Interviews and email contact with key informants, including three academics/researchers and two ES staff (from the Metropolitan Police Service (MPS))

- Internet searches.

In addition, we carried out four key informant interviews, three with experts/academics involved in researching the role of social media in the London riots and one with a representative of the MPS. The purpose of these semi-structured interviews was to supplement information available from the literature with 'first hand accounts' and insights specific to the nature of our investigation, to gain a methodological insight into the opportunities and challenges of innovative ways to research the impact of social media in emergencies, and to obtain leads for further interviewees.

The final case study database contained 25 items, including a mixture of grey literature (government or other authorities' publications), scientific articles, websites and interview transcripts.

The next step involved developing explicit rules of coding, which entails constructing a coding frame that enables each item in the database to be systematically analyzed using common constructs [Thor71; Nuen02]. The coding frame contained a set of pre-defined high level codes, which drew on the dynamic framework for impact assessment of social media included in Deliverable 2.1 as well as the Theory of Change work carried out thus far.

Relevant sentences or paragraphs from each item of literature were then allocated to the relevant code, using a Microsoft Word proforma, and then subjected to a further coding process where, in an iterative manner, sub-categories were developed (Appendix A provides the coding framework used for this case study). Thus, developing the constructs and codes relevant to each item of material analyzed is an iterative process, based on 'reduction' [Cres98]. We used these codes and the text allocated to them to structure and guide the analytical and reporting work presented in Chapter 3 below.

2.3 Case selection and rationale

The '2011 London riots' was chosen as the first case study carried out as part of Tasks 2.2 and 2.3 because:

- It is a comparatively well documented 'case' in terms of the role social media played in the course of the emergency, hence making it possible to test and validate the methodological approach chosen as well as the research toolkit designed to aid case study execution
- It allows the research to explore all parts of the EMC. Thus, whilst focusing on response and recovery, the case study also touches on prevention and preparedness hence covering the whole of the EMC.
- It falls into the category of 'social hazard' (using the typology developed in D2.1), widely perceived as having been at least aggravated by social media. This has made it easier to focus, in one case study, on both citizens and ES.

This Deliverable therefore presents the results of the initial case study that applied the methodology in the first wave of case study analysis. Subsequent deliverables will report on the following waves of cases.

3   The London riots case study: context, use and impacts

3.1   Context and background

The London riots that occurred between 6th and 10th August 2011 were part of a broader outbreak of disorder, arson and looting that took place in a number of English cities. Thousands of people took part in disturbances across the capital. In most of these areas, shops were looted and buildings burned. The rioting then spread outside the capital to other UK cities, including Liverpool, Manchester, Birmingham and Bristol. It is generally accepted that the 'spark' that precipitated the riots was the death in Tottenham, North London, of a local man, Mark Duggan, who was shot by police on 4th August. The protest march that followed then turned into a number of violent clashes between police and protestors, in which police vehicles, a bus, Magistrates court and a number of homes and businesses were destroyed. Overnight, looting took place in a retail park near Tottenham and in the nearby area of Wood Green. As these events attracted widespread media attention, so the scale and spread of the disturbances grew. Over the next few days, rioting took place in a number of areas in London, including Hackney, Brixton, Walthamstow, Peckham, Enfield and Croydon. By 10th August, rioting and looting had spread to fifty-eight separate locations in London. By 15 August, according to BBC news sources, about 3,100 people had been arrested, of whom more than 1,000 had been charged. A total of 3,443 crimes across London linked to the disorder were recorded. Five deaths were directly attributed to the riots, with at least 16 people injured as a direct result of related violent acts. A total of 186 police officers were injured as well as 10 firefighters from the London Fire Brigade, who were called out to deal with over 100 fires associated with the disorder. The property damage attributed to the riots – which included Sony's main DVD and CD distribution center, a 20,000 square meter warehouse in Enfield – was estimated at £200 million.

Whilst the arson and the chaos mirrored scenes from three decades earlier – the Toxteth riots in Liverpool; the Brixton and Tottenham riots in London in the mid-eighties – what made this different was the scale of the disorder, and the speed at which it spread, or, as one senior police officer put it, the 'contagiousness of it'. It was also claimed that what also made this different was the role played by BlackBerry Messenger (BBM) and other types of social media. Some reports suggest that video footage shot by citizens contributed more to the identification and arrest of rioters than did conventional closed-circuit television (CCTV), as police forces used websites like Flickr (see section 3.2.1 below) to find images of rioters and looters (The Daily Telegraph, 9th August 2011). Google Maps showed satellite views of what was happening in the streets during the rioting. Channel 4 News used similar interactive maps that tracked damage in specific streets. There were reports that BBM was used by rioters and looters to organize their activities and to stay one step ahead of the police, leading some commentators to label the riots as the 'BlackBerry Riots' (The Economist, 13th August 2011). Thus, it was claimed that the BBM messages, re-posted on Twitter and Facebook, were used to dispatch rioters to areas where it was known there was no police presence. One BBM broadcast, for example, directed rioters to head for Stratford in East London: "If you're down for making money, we're about to go down hard in East London tonight, yes tonight!!! … Doesn't matter if the police arrive 'cos we'll just chase dem out because as you've seen on the news they are NOT ON DIS TING. Everyone meet at 7 at Stratford Park and let's get rich" (The Guardian, 9th August 2011). However, there is also some evidence that Twitter made a positive contribution in the rioting by helping citizens to keep up to date with news on the riots, helping them to establish whether family and friends were safe and by supporting recovery efforts, for example through helping citizens organize 'clear up' activities in the aftermath [TPT12].

The criminal justice system's response to the riots was swift and uncompromising. Analysis of Ministry of Justice data showed that of the 3,051 cases of people who came before the courts, 37% received a custodial sentence by the Magistrates court, on average of 6.5 months. This compares with 12% of those

who had come before the Magistrates court over the preceding year and whose average sentence was 2.5 months. Similarly, 82% of convicted rioters who came before the Crown Courts (the 'higher level' courts) received a custodial sentence with an average of 19.4 months, compared with 33% over the preceding year and with an average sentence of 11.3 months.

The Riots Communities and Victims Panel which was set up by the Government to investigate the causes and provide policy recommendations reported its findings in March 2012 [SRMM12]. The Report's main conclusions focused on the failings of governmental agencies to address the problems faced by 'troubled individuals and forgotten families'. Its recommendations focused on making communities socially and economically more resilient by creating conditions in which individuals respect each other and the place they live in; providing joined-up public services; creating more opportunities for young people; supporting parents and schools in developing young people's values and character; promoting better communication between police and public to maintain law and order; ensuring that the criminal justice system punishes offenders.

A study carried out jointly by the Guardian Newspaper and the London School of Economics [LNTM+11] addressed the causes of the riots by collecting detailed data on the experiences of people involved – including an analysis of the 2.5 million 'tweets' recorded during the riots – as well as those who did not get involved. The main conclusions of this analysis suggested that the key precipitating factors were: opportunism – the chance to get 'free stuff'; a pervasive sense of injustice, for example the increase in student tuition fees and the scrapping of the education maintenance allowance; antagonism with what people saw as over-bearing policing policies and a pervading perception that their lives, experiences and aspirations were simply ignored by 'the system'. The report concluded that youth gangs played no key role in organizing the riots.

In the context of EmerGent, the London riots provide a good example of a 'third level' emergency [Alex02]. This is defined as 'a major incident or disaster requiring regional or 'inter-jurisdictional' resources and higher levels of coordination'. It also represents an example of a 'social hazard', defined as 'an event caused by humans and occurring in or close to human settlements' and, more specifically a 'crowd incident' (see D2.1 [CSJD+14]).

3.2 The use of social media in the 2011 London riots

Whilst some labelled the riots the 'BlackBerry Riots', and others focused on social media in general or Twitter in particular, our review of grey and academic literature revealed that a whole range of social media played a part. The questions of what technologies were used how and to what effect are discussed in the sections below.

3.2.1 Types and scale of social media usage

Using the definitions of social media offered in D3.1 [RLFM+14], 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, we identified a range of platforms that featured in the London riots. The online social networking sites Twitter and Facebook and the instant messenger application BBM appear most prominently in accounts of the role of social media in the riots. In addition, social networking sites such as Bebo and Tumblr as well as video and image hosting websites such as Flickr and YouTube also appear in the literature on the riots. The main characteristics of these and other related social media platforms are summarized below:

Tumblr is a microblogging platform and social networking website which allows users to post multimedia and other content to a short-form blog (i.e. a discussion or informational site published on the internet). Users can follow other users' blogs, as well as make their blogs private [WWW06].

Facebook is an online social networking service that allows users to create profile, add other users as "friends", exchange messages, post status updates and photos, share videos and receive notifications when others update their profiles. Facebook enables users to choose their own privacy settings and choose who can see specific parts of their profile. This means that users can control who sees other information they have shared, as well as who can find them in searches, through their privacy settings [WWW07].

Bebo was a social networking website launched in 2005. Users were given a personal profile page where they could post blogs, photographs, music, videos, and questionnaires, which other users could answer. Additionally, users could add others as friends and send them messages, and update their personal profiles to notify friends about themselves [WWW08].

BlackBerry Messenger (BBM) is an instant messenger application included on BlackBerry devices that allows messaging between BlackBerry, iOS, Windows Phone and Android users. Messages are sent over the Internet and use the BlackBerry PIN system. Communication was only possible between BlackBerry devices until late 2013 when BBM was released on iOS and Android systems. Exchanging messages is possible to a single person or via dedicated discussion or chat groups, which allow multiple BlackBerry devices to communicate in a single session [WWW09].

WhatsApp Messenger is a cross-platform instant messaging subscription service for smartphones and selected feature phones that uses the Internet for communication. In addition to text messaging, users can send each other images, video, and audio media messages as well as their location using integrated mapping features [WWW10].

Flickr is a web hosting site for users to share personal photographs and videos. Site content can be accessed from Flickr without the need to register an account but an account must be created in order to upload content onto the website. Registering an account also allows users to create a profile page containing photos and videos that the user has uploaded and also grants the ability to add another Flickr user as a contact [WWW11].

YouTube is a video sharing website that allows users to upload, view, and share videos. Unregistered users can watch videos, and registered users can upload videos to their channels. Videos considered to contain potentially offensive content are available only to registered users affirming themselves to be at least 18 years old [WWW12].

In the context of this case study it is useful to distinguish between 'open' and 'closed' social media platforms. This designation of particular platforms as open or closed depends on the accessibility of the content to the public. Platforms such as Twitter and Flickr are considered the most 'open' as most of their content is available for anyone to view on the internet (although users can restrict access to their content). In contrast, instant messaging platforms such as BBM or WhatsApp Messenger are considered 'closed' as their content can only be viewed by its intended recipients. Platforms such as Facebook and Bebo sit somewhere between these two poles as the accessibility of the content on these sites depends on the privacy settings of each account holder.

There are two implications from this characterization. First, it is not possible to provide an exhaustive description of the scale of social media use during the riots because investigations of the scale of use are skewed in favour of the relatively easily publicly accessible Twitter platform. Thus, the most in-depth analysis of social media focused on Twitter use during the riots and worked with a sample of 2.6 million tweets sent during and immediately after the riots which gives some indication of scale [PVV13]. However, this provides only a partial view of the scale of use, as each one of these tweets is likely to have been viewed by multiple Twitter users and in many cases re-tweeted to their own followers. An illustration of this is the fact that tweets relating to the riot clean up campaign reached 7 million Twitter users

particularly through the involvement of celebrities and users with many followers, while some tweets from citizens received almost 4000 retweets during the riots [PCKV13]. However, even these indications of reach are likely to be substantial under-estimates. Although [PVV13] and the associated academic literature examined 2.6 million tweets, their sample only included tweets that contained specific riots-related hashtags. One key informant suggested that there may have been up to ten times as many tweets that did not use the relevant hashtags about the riots than were included in these studies.

In contrast, no such specific figures are available for the closed and semi-closed social network platforms. In the case of both BBM and Facebook, the literature tends to make more general statements about the scope of social media use as their more closed nature makes it much more difficult to get a reasonably accurate understanding of use. Thus, there has been much less systematic analysis of the use and impact of such forms of social media, and no statistics on numbers of users and messages sent via these platforms. Instead, accounts of their use tend to be more sketchy and apocryphal. For example [Pana14] notes that "several BlackBerry messages were widely circulated on the 7th and 8th of August to encourage rioters to hit Central London shops" (p.351) and [Brig12] suggests that "Resentment continued to be stimulated through this posting [on Facebook] until after only a few hours, it was deleted [The photo of Mark Duggan]. However, the fact that large numbers of people had seen it meant it was not forgotten." (p.7-8).

The second implication from the distinction of social media platforms as open and closed is that it allows for part of an explanation of how they were used. This will be discussed in the section below.

3.2.2   Social media usage patterns

The literature analysing the role of social media in the London riots identifies a rich tapestry of social media users. Far from social media usage having been the exclusive domain for 'rioters' to organise themselves and their activities, social media became widely used tools for communicating, informing and law enforcement. From the literature it is possible to identify three broad types of social media users that mattered during the London riots: **citizens**, **authorities** and the **media**.

3.2.2.1   Citizens' use of social media during the riots

Much of the analytical work carried out on the use of social media in the London riots focuses on the **individual citizen user**. Across the literature, we have found that citizens took up a number of roles, and that different types of social media were used to perform these (for the idea of 'roles' see also D3.1 [RLFM+14]):

The role of '**active participant'** (rioter) is perhaps the one that has attracted the greatest (media and research) attention. In a set of events that at the time tended to be perceived as accelerated and facilitated by social media (to the extent that the British Prime Minister David Cameron, briefly, called for a shutdown of social media in future unrests [DBK13]), many studies published subsequently made the role of social media part of their investigation. What emerges from this work is that, far from 'social media' as a whole having been a factor in supporting the riots, those actively participating in the riots (be this through rioting or looting) almost exclusively used the closed network technology offered by BBM [TPT12; PVV13]. Whilst a small number of individuals were arrested for using Facebook to advocate or organise rioting [Coop12, TPT12, SRMM11], efforts that turned out to be futile as no one showed up, no one was arrested on similar suspicion for using Twitter [LNTM+11] where, in fact, those supporting the riots were "typically swamped with a deluge of overwhelmingly negative responses" or were ignored [LNTM+11]. As [TPT12, p. 49] concludes: "In the case of the British riots, there is little overt evidence that Twitter was used to promote illegal activities at the time, though it was useful for spreading word about subsequent events."

Indeed, BBM was the technology of choice for spreading/accelerating the riots [LNTM+11, MSMW11]. Qualitative studies, based on interviews with some of those who participated in the riots, reveal three main reasons for the prominence of this platform during the riots [PVV13; MSMW11]:

- The prevalence of BlackBerry handsets and hence BBM among individuals with low or no incomes as messages could be sent via BBM free of charge [MSMW11]
- Low levels of use and awareness among these sectors of the population about other social media technologies such as Twitter or Facebook
- A fear of using other more open social media platforms (such as Twitter or Facebook) due the public nature of content and hence the ability of the police to follow posts and use them for law enforcement. *"The internet and that is a bit too bait, so no one really broadcasts it on the internet.(…) Like Twitter there's like a hashtag innit, like if someone hashtags riots you can go to that certain page and see what everyone has been saying about the riots. Police could easily go to that page there and see who's been setting up or organising groups to come"* [BaLe11].

In the context of the riots, it seems therefore that the open or closed nature of platforms influenced who used the different types of social media and for what purpose. Thus, for those involved in the riots, BBM was seen as the best way to share and receive information about current and next locations for rioting, together with calls to join in at what time, as well as safe routes home and what police were doing [PCKV13]. For instance, *"(w)ithin hours of the first disturbances in Tottenham late on Saturday, a message pinged out, first on to a few [BlackBerry] phones, then dozens, then hundreds across north London: 'Everyone in edmonton enfield wood green everywhere in north linkup at enfield town station at 4 o clock sharp!'"* [PVV13, p 31].

Whilst some used this information to get actively involved in the disorders, others were found to have taken up roles as **bystanders** – using social media information to go to the locations of the riots and watch what was happening and posting scenes onto social networking sites [MSMW11, WWW01].

In contrast, a different kind of active participation in the riots appeared to be facilitated through Twitter, possibly reflecting the different demographic of users of this platform (more affluent, educated users). The literature suggests that Twitter users took up most notably the roles of **'informant'**, **'helper'**, **'amplifier' and 'citizen journalist'**.

Thus, some citizens forwarded inciting tweets or BBM messages to the police or reported them via 999 calls [PVV13, WWW01], effectively acting as **'informants'** and supplying intelligence to aid law enforcement activities by the Police. According to [PVV13], '(o)ne typical response read: *"someone … has just posted: Go on Hackney! Fuck the feds! #hackney Can we have them arrested for incitement pls?"'.*

The 'helper' role took different forms. In the response phase, **'helpers'** called for people to stay at home (for example, through the #OperationCupofTea started by television celebrity) or led 'communities to discourage rioting in their area' [MSMW11, SRMM11]. During the recovery phase, it was the mobilisation of clean-ups via Twitter that has attracted some analytic interest [PVV13, TPT12, LNTM+11, DCLG13]. In a study by [PVV13] "more than 12,000 individuals were identified as mobilising support for the riot clean-up." Moreover, sites like Facebook and Tumblr were used to fundraise to support recovery from the riots [TPT12].

Figure 1: Clean sweep: Brooms at the ready, people brought together through Twitter gather to clear up Clapham Junction. The picture, which was viewed more than 100,000 times, was taken by Twitter user @Lawcol888 [WWW04]

The clean-up example [PVV13] established the crucial role of '**amplifier**' for the fast spreading of messages on Twitter. Generally, analyses of Twitter traffic during the riots show a high degree of copying / re-posting of existing content. Thus, [TPT12] found that 48 percent of the tweets analysed contained a re-tweet; of those, 45 percent contained one or more hyperlink (i.e. a link to a website). Slightly over a quarter of original tweets contained one or more links, referring to traditional media web presences or social media sites (with images more popular than textual sources).
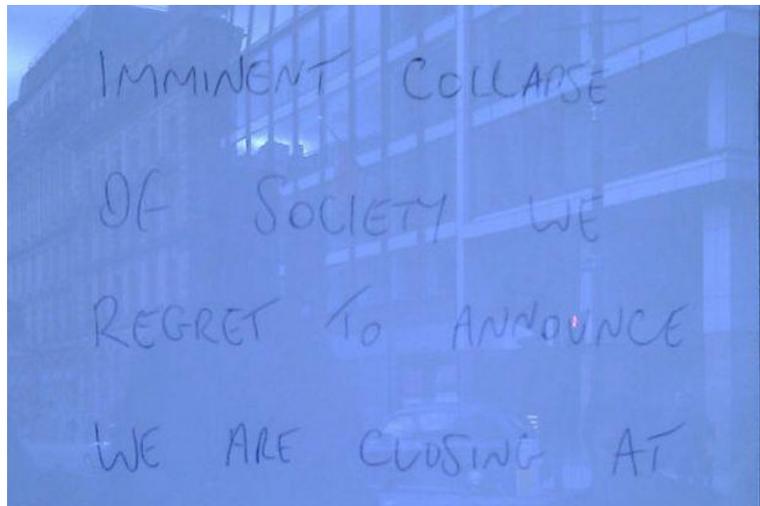
Figure 2: Sign on the door of a Subway store in Manchester: The handwritten note, which read "Due to the imminent collapse of society we regret to announce we are closing at 6pm tonight", was viewed by more than 300,000 people [WWW05]

It would seem that to get a message heard it helps to have it picked up by such an 'amplifier' – a Twitter user who, as a result of having a lot of followers, is able to spread a message widely and quickly. During the riots, such 'amplifiers' were often celebrities or media personalities. For instance, [TPT12] found that of the top 10 re-tweets during the London riots, four out of the top 5 originate from celebrities and media figures. Thus, she concludes "tweets that are made by popular or newsworthy people are more supported (retweeted), in general, than non-notable people" [TPT12, p.56].

Finally, another role taken by citizens using more open forms of social media during the London riots was that of '**citizen journalist**', reporting and commenting on the events as they unfolded. [PPV13] notes the relevance of such citizen journalists on social media in the context of the emergence of rumours on Twitter. During the London riots, a number of rumours emerged, including pictures of the London Eye on fire and army vehicles being deployed into the City of London.

Figure 3: Rumors spread on Twitter during the London riots [WWW01]

[PPV13] found that in all cases studied, such citizen journalists played a crucial role in the denial of such rumours, following a common four-stage pattern (see Figure 4 below): "A common feature in these rumours is that the mainstream media is seen to lag behind crowd-sourced ('citizen journalism') reports appearing in social media" (p.207).

(1) A rumour starts with someone tweeting about the occurrence of an alleged incident.

(2) The rumour gets retweeted (….). Some form of evidence – eyewitness reports, references to mainstream news sources, links to pictures (…) or to mainstream news sources on the Web, etc. – may be added as the original tweet gets retweeted and various reformulations of the rumour also begin to appear.

(3) Others begin to challenge its credibility (i.e. make a counter-claim), perhaps on the basis of logical arguments (e.g. 'it's not possible because …') or new information that throws into doubt the reliability of evidence previously offered.

(4) A consensus begins to emerge (….). Where this is that the rumour is false, it may nevertheless re-surface in the corpus as latecomers pick up the original tweet and join in.

Figure 4: Pattern of rumor generation and correction on Twitter [PPV13, p.207]

In addition to these active roles, citizens were said to have taken up a number of more passive roles on social media, and in particular Twitter, most notably that of **information consumer**.

In terms of **information consumer**, social media was often used by citizens to supplement other information gained from more traditional media sources, in particular with, "mainstream media organisations often struggling to keep up with the fast-moving and unpredictable spread of the unrest" [BaLe11]. In fact, the role of social media as alternative – and perceived more reliable – news source already emerged prior to the rioting when social media, including Twitter, Facebook and BBM, were used to discuss and provide information about the Mark Duggan shooting and subsequent police actions before these were reported in the mainstream media [Brig12]. It should be noted, however, that social media was

only one component in a mix of sources that young people drew on to inform themselves about the riots. As [MSMW11, p.36] found: 'Young people were generally able to describe quite vividly how they found out about the riots. Television news was clearly important, with young people also receiving more information about local events via social media (Facebook and BBM) and text messaging.'

3.2.2.2   Authorities' use of social media during the riots

Whilst local authority use finds some mention in the literature we studied, it was really how the Metropolitan Police Service (MPS) engaged with social media during and after the riots that has attracted most attention.

Unlike citizens' use of social media, it would seem that the MPS had a less sophisticated approach to engaging with this technology during the London riots. Whilst UK police services had started to use Twitter in 2011, not all forces were equally enthusiastic. The MPS lagged behind Greater Manchester Police (GMP), for instance, in how they had incorporated Twitter into their communication strategy [PVV13]. Among others, MPS had not set up accounts for its local forces that could be managed by teams and individuals policing communities, operating a centrally administered force level account only. This can, perhaps, be interpreted as reluctance towards incorporating social media into ways of working, also rooted in police culture [WWW01, PVV13].

The more rudimentary use of social media before the riots meant that MPS was ill equipped to use this technology to either predict or prevent the rioting or to provide a more effective response to the riots as they unfolded. Challenges faced include:

- Lack of clarity about the volume of (social media) data needed for tactical decision making. "Some [public order commanders] wanted 'all the information' available (…), others quickly found this only overwhelmed them" [HMIC11, p.30].
- Inability to keep up with, and make sense of, the large volume of social media postings, in a context where (often) insufficient staff and lack of staff with social media training were available, information came in from multiple sources (police officers on the streets, 999 calls, social media) and the content of the postings was "conflicting and often contained wrong or misleading items." [HMIC11, p.31]
- Making the step from information to intelligence proved difficult, especially because of the speed at which information was posted which meant that the "MPS could not comprehensively monitor social media in real-time and was therefore not in a position to be moving ahead of events" [MPS12, p.105].
- Lack of technical equipment that could have made the task easier. "The Police Service had not adopted the social media monitoring tools (offered by a number of commercial suppliers, and used by other government agencies) which would allow it to quickly process and evaluate large volumes of online information" [HMIC11, p.31].
- Procedural issues such as the need for the evidential capture of material before it was deleted from the public arena [MPS12, p.105]

It therefore appears that, on balance, MPS was ill equipped technically, procedurally and operationally to deal with social media during the riots [TPT12, WWW01, SRMM11, PVV13]. This means that MPS failed to engage citizens in a timely manner with correct information, leading to an 'information vacuum' in which rumours could grow, to gather intelligence to prevent further outbreaks and to counter rumours effectively [SRMM11]. However, one of the more successful MPS social media strategies was employed during the recovery phase, when it created a dedicated Flickr site to post CCTV images of suspects and appealed to the public support to help identify them [Pana14, WWW01]. Tweets using image links were re-tweeted at least 8,500 times [DBK13].

The MPS' lack of experience with social media prior to the riots was said to have been reflected in the style of communication employed during the riots. [DBK13], for example, notes that tweets sent by MPS were much more formal and impersonal than those sent, for instance, by GMP. This is explained by the fact that GMP were able to draw on their previous experience of local officers using Twitter to report on their daily work and directed their tweets at individuals rather than at a general audience. Thus for GMP: "fighting rumours, establishing a trusted voice and the support of intelligence gathering were the main priorities when using Twitter" [DBK13].

3.2.2.3   Other users

Mainstream media were a third and important user type of social media during the London riots. [WWW03] found that the most influential Twitter users (those receiving more than 500 mentions from other users) were "dominated by mainstream media. Official Twitter accounts belonging to mainstream news organisations, such as @BBCNews or @Guardian, were mentioned more than 126,000 times in relation to the riots. Accounts belonging to professional journalists working for the same organisations got a further 89,000 mentions."

3.3   Impact and outcomes of social media use

The impacts and outcomes of social media use during the riots are contested by commentators. Some posit social media use as pivotal in the planning and execution of the riots, and in creating the conditions for the riots to occur, while others argue that available evidence points to a limited effect of social media in promoting disorder and being influential in attempts both to discourage and organize clean-ups after the riots. The types of impacts identified can be categorized by time (when they occurred: in the short or more long term) and by types and intention of users.

3.3.1   Short term effects

3.3.1.1   Effects of social media on citizens' behaviour

Our analysis of the data suggested three hypotheses of the negative effects of social media use during the riots. These suggest that social media:

- Spread information about the event and influenced opinions about it
- Supported the spread of the riots beyond the immediate locality
- Helped to coordinate the activities of rioters.

In contrast, our analysis suggests the following positive short-term effects of social media usage during and after the riots, including:

- Discouraging some people from participating in the riots
- Organising citizens in cleaning up the damage caused by the riots
- Raising money to compensate those negatively affected by the riots

These are explored in greater detail below.

[Brig12] and [LNTM+11] suggested that social media **contributed to the rapid spread of information and influenced public opinion** about the shooting of Mark Duggan in Tottenham, the event widely recognised to have been the trigger for the subsequent disorder. In particular, [Brig12] stated that: "it seems social media played a significant role early on in stimulating attention towards this particular event (p.7)." Photos of the shooting were posted on Facebook very soon after the event which, it was argued, contributed to the perception that the police and mainstream media were not providing a full account of the events:

"the local community came to learn that something was not quite right. The ambiguity of media reporting and lack of clarity from the police did not satisfy them over the next 24-hours and a protest was quickly organized" [Brig12, p14].

Similarly, [LNTM+11] suggested that BBM was used to stoke negative sentiment towards the police amongst the local community. A member of the original protest outside Tottenham police station explained that: "cos I knew a couple of people that knew Mark Duggan, so they were sending broadcasts saying 'he was a good person', 'he's innocent'" (p.31).

However, others disagreed with the view that social media helped to spark the riots, by influencing public opinion about the event and against the police. Thus, a MPS key informant argued that the initial response to the shooting mirrored other similar events in previous years prior to the advent of widespread social media usage:

"The way it started in Tottenham wasn't really affected by social media; it was a relatively small group of people with a common purpose who had specific issues that they were very upset about and they wanted to take their anger out on the police." (Metropolitan Police Service key informant)

Instead, he and other commentators argue that one of the main effects of social media usage was the way it helped to **spread the disorder both locally and nationally**. As he noted:

"When it spread nationally, it wasn't for this common purpose – those who rioted in Bristol didn't, I think, have any interest in Mark Duggan ... they had an interest for all kinds of reasons […] and social media was used to organize that in other areas, and I'm not sure whether without social media that would have happened in the same way." (Metropolitan Police Service key informant)

This rapid spread of disorder to other areas was characterised by some commentators using the metaphor of 'contagion'. [DFWB13] for example argue that:

"In the case of London, there is a widely-held perception, that awareness of disorder provided a self-reinforcing stimulus to rioter involvement, facilitated in many cases by social media. These ideas are clearly fundamental to the evolution and spreading of disorder, and suggest a contagion-like mechanism for this."

However, few would claim that this process of 'contagion' involved social media use alone. Instead, reports suggest that news media coverage as well as individuals' perceptions of the situation locally also influenced and contributed to decisions to participate. One critic [Coop12] of the mainstream media's coverage of the riots, for example, argued that:

"In terms of television news coverage, the troubles turned into an immediate media event with 24-hour rolling coverage of burning buildings and vehicles, hooded youth and a carnival of hedonistic looting. […] when such representations are rolled out uncritically via 24-hour news bulletins, tabloid newspapers and social media sites, the opportunity arises for […] 'deviancy amplification' (encouragement to join it) (p.14)".

This point was corroborated by other research which suggested that television news was the single largest contributor to spreading awareness of the riots among those who participated. It found that: "More than 100 of the project's 270 interviewees referred to hearing about the riots via pictures on television news – more than Twitter, texts, Facebook or BBM" [PVV13, p.33].

The point above should caution against concluding that social media operates by itself to impact on a situation. The effects of social media in cases such as the riots are better understood to arise as a result of their combination with other sources of information, including print and television media, online content, as well as images and videos taken by those present. Instead, it provides an ability to amplify messages and

images and spread them in fast and, often, unpredictable ways. In this sense, the use social media was one of many factors that informed people's perceptions of the situation, both in terms of their assessment of the risk and benefit and of the acceptability of participation.

While there is broad agreement that the use of social media contributed to geographical spread of the unrest through raising awareness in other areas of events in Tottenham, there is less consensus around whether social media technologies were used to **actively coordinate riots and looting**. Overall, there is general agreement that open, or semi-open, social media platforms such as Twitter and Facebook were not used on a significant scale for this purpose. As [PVV13] state: "researchers found little to no evidence of incitement on Twitter" (p.32). This view is supported by the lack of subsequent legal action which saw not a single person convicted for inciting riots on Twitter [BaLe11] and only two convictions for the same offence on Facebook, even though: "in neither case did anyone turn up for them" [TPT12]. As argued in section 3.2.2, those engaged in criminal acts preferred the use of closed social media platforms: "closed Blackberry message networks seem to have been much more important in alerting potential rioters to where the action was going to be" [WWW03]. As one rioter observed:

 "All I know is that the Blackberry was enough to give me enough information, or tell me at the time, of what was going on, where to stay wary of and what sort of things were targeted." [PVV13]

This account chimes with reports from other sources that suggest that BBM helped those involved in the disorder to evade the police and share information about locations and goods available, leading to a higher degree of organization among those participating in the unrest. [Pana14] concludes that "the speed and ability to organize riots were certainly enhanced by mobile technologies" (p351). Similarly, another report [MSMW11] concludes that the use of BBM led to people joining from a wider geographical area than was evident in other instances of disorder:

 "Interviewees described receiving BBM messages early in the afternoon giving information on where to be and at what time. Possibly as a result, it appears that those involved may have come from a wider area of south London, from Brixton and Fulham for example" (p17-19).

However, it is worth noting that researchers' ability to provide strong evidence of the extent to which social media such as BBM was used in such ways is of course limited by the lack of easily available data (see section 3.2.2.1).

While our analysis supports the view that social media played a role in spreading the riots in London and nationally as well as contributing to the coordination among looters and rioters, there is also substantial evidence of the **positive effects of social media usage**. Indeed, some commentators citing such examples concluded that: "closing down such social media might have had the opposite effect from that intended" [PVV13]. Similarly, a key informant suggested in our interview with him that the absence of social media during the riots would have impacted most upon communities' abilities to organize clean-up events. He asked: "How would communities have reached out to one another and marshalled their efforts? It is hard to imagine how to do that on that scale and that effectively. It's a grass roots tool" (Academic key informant).

Indeed, some research suggested that in some cases information circulating on social media about the riots **prevented participation** due to the 'scary nature' of some of the reports [MSMW11, p.36]. In the case of Twitter, the majority of messages about the disorder condemned the rioting and discouraged participation. As [BaLe11] argued: "the tiny fraction of tweeters who did use the public platform to support the riots were typically swamped with a deluge of overwhelmingly negative responses." This view was confirmed by [SRMM11] who stated that: "In some cases, family members, community groups and authorities effectively used it both to dissuade people from going out onto the streets and to reassure

communities" (p46). Where examples of incitement to riot on open platforms were found, the public tended to criticize and disparage these messages and in some cases forward details on to the police.

A strong conclusion to emerge from the Guardian and LSE investigations into the riots, as well as from several other reports, was that contrary to popular belief at the time, social media had predominantly been used as a way of **organising 'pro-social' efforts** to counteract the effects of riots locally. Analysis of Twitter in particular showed that the platform was used **during the recovery phase of the EMC** to help organise citizens in cleaning up damage caused by the disorder: "Twitter did […] show it was entirely capable of mobilizing large numbers of people on to the streets when it was used by the public to organize a clean-up of riot-damaged streets" [BaLe11]. While the riots were still underway, members of communities and areas affected by the disorder began to suggest local people contribute to the clean-up of damage. For example, the hashtag #riotcleanup, appeared in more than 12,000 tweets, that were retweeted more than 31,000 times and were estimated to have reached around 7 million Twitter users [BaLe11]. This initiative and others like it led to groups of citizens turning out to help with the cleaning effort in several areas of London. Images from these efforts were then spread through social media (as well as the traditional media), potentially contributing to similar events occurring subsequently in other areas around the country.

Twitter also saw **targeted campaigns to raise money** for individuals or local businesses that were especially affected. As [TPT12] explains:

> "Several such initiatives raised around £30,000 ($45,000) each for people including 89-year-old barber Aaron Biber and shopkeeper Siva Kandiah to pay for repairs to commercial premises and contents. Perhaps the highest-profile case was that of the #somethingniceforashraf appeal for Ashraf Haziq, a Malaysian student who, having been injured, was then robbed by a group of youths under the guise of rescuing him (p.51-52).

3.3.1.2   The effect of social media on Emergency Services during the riots

Key official reports written in the wake of the London riots have tended to be highly critical of the police response to the riots, particularly in terms of their perceived inability to make use of the large quantities of relevant information about the events available on social media [HMIC11, MPS12]. The main reason given for the failure to make better use of social media is that the police were overwhelmed by the volume of social media activity. As one report [MPS12] concluded:

> "The MPS [Metropolitan Police Service] struggled with the volume and task of identifying accurate intelligence during the disorder. The MPS could not comprehensively monitor social media in real-time and was therefore not in a position to be moving ahead of events" (p 8).

This was confirmed by a MPS key informant who argued that:

> "There was a huge amount of information coming in – stuff that was open source on Twitter and blogging sites and Facebook … so when you went back (afterwards) and looked at it … you could see from this Tweet that that particular furniture store was going to be attacked so you could have done something about it, because it was on Twitter half an hour earlier saying that was going to be the next target … but it was the volume, the number of information coming in that made it impossible to pick up" (Metropolitan Police Service key informant).

Despite these well documented difficulties, there were some examples of the use of social media data during the riots to inform policing decisions:

> "The Metropolitan Police successfully deployed officers to Oxford Circus as a result of monitoring and actioning information from social media. These officers arrived in time to confront 50 to 60

youths gathering in response to a message stating "Meet Oxford Circus shops going to get smashed up. Get free stuff" [HMIC11, p31].

3.3.2 Longer term effects

The main longer term effects of social media usage during the riots can be seen in changes in the policies and procedures of the MPS with regard to social media. These include [MPS12, p.101]:

- Increase of MPS followers on Twitter to 53,000 following the riots (and up to 239,000 by December 2014).
- Development of the @metpoliceuk Twitter feed, creating more varied content (including links to stories on the MPS website, comments from Commissioners and invitations to MPS events)
- The development of a Twitter account called @mpsonthestreet. This feed, which employs a conversational style, is taken over for a day by an officer or unit who will reply to members of the public who tweet at the address.
- Creating local borough level Twitter accounts that are managed locally. They are used to both 'broadcast' information to local communities as well as to take questions.
- Extension of the MPS social media presence through: a) the creation of an MPS Facebook page which promotes key campaigns and the Commissioner's community road shows; b) the use of Bambuser[1] for live streaming of policing during events or on other occasions.

These changes in the use of social media by the MPS were confirmed via our key informant interview – which highlighted a recent case in which the social media was used to dispel a false rumour:

> "There was one a couple of years ago at a demonstration, where someone tweeted that the police were bringing the horses out and that they were obviously preparing for trouble, but it wasn't – it was just coincidence they were going out to exercise in the park – so we could put something out to that effect: 'You might have seen the horses – they are not being used for this particular event'" (Metropolitan Police Service key informant).

At an organisational level, the riots seem to have triggered a set of actions designed to ensure a more sophisticated engagement by the MPS with social media. Among others, this has involved:

- Setting up a Digital Communications Steering Group to develop an effective response to social media and communications by putting in place systems and structures to monitor, engage and respond to social media in a responsive manner. This includes a strand of work to boost the MPS' ability to use social media as a law enforcement tool [MPS12, p 129].
- Create more designated MPS staff trained in social media engagement, specifically at borough level [MPS12, p.102].
- Improve the way the MPS engages with communities on a day to day basis using social media in order to improve its ability "to inform the public on what is happening, to actively listen to online community concerns, to appeal for assistance and crucially to provide reassurance in the way that it is conducting its business" [MPS12, p.101].

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[1] An interactive live video broadcasting service, for streaming live video from mobile phones and webcams to the internet.

4   Lessons learnt

This chapter draws out some conclusions and lessons learnt so far from the first case study conducted, building on the analysis of the use of social media during the London riots and its impact and consequences for ES and citizens.

4.1   The use of social media in emergencies

The London riots case study has highlighted some key points about how social media are used by citizens and ES during and after an emergency that are of relevance to the ongoing development of the EmerGent Theory of Change and project overall. These include that:

- ES staff need to be aware of the typical audience and message content and tone of different social media platforms when attempting to communicate before, during and after emergencies
- Social media influence citizen behavior alongside other more traditional media and are not necessarily more effective in doing so
- Social media messages sent out by 'credible voices' and by those with many followers on Twitter are able to provide accurate and up-to-date information to citizens quickly during an emergency
- Information quality and false rumors generated by social media can be a serious concern for ES – however, there is evidence of self-correcting natural mechanisms as well as natural indicators in social media messages that can be used to identify rumors and stop them before they spread too far.

Further details on these key points are provided below.

The London riots case study has suggested that different social media platforms were used by different types of users and for different purposes. Thus, there appeared to be a social class aspect to social media use, whereby different platforms tended to be used by different layers of society and for different reasons [LNTM+11]. In particular, closed platforms were used often to organise criminal behaviour, while more open platforms, including Twitter and Facebook, were used by more affluent citizens to organise positive responses to the riots. This would suggest that different people are reached through, and engage in, conversations via different social media platforms – while some citizens do not engage in this type of communication at all (see also D3.6). When it comes to A2C communication as part of the EMC, an awareness and consideration of platform, audience and message content and 'tone' might therefore be required to communicate successfully. Unless ES staffs are themselves ordinarily active users of social media, lack of experience and knowledge, as well as of technical and procedural ability (as well as followers), is likely to impair effective / impactful communication with citizens. Furthermore, engaging with closed social media (BBM) will be much more difficult (if not impossible) than via open or semi-open social media (Twitter, Facebook). Subsequent case studies will need to explore, though, whether such distinctions still hold true now and in other emergencies / countries.

At the same time, social media communication does not happen in a vacuum. There is a close, possibly symbiotic, relationship with other media. Judging by the analysis done on Twitter traffic during the London riots, much of the content being tweeted originated from traditional media or journalists. In fact, the case of the London riots has indicated that television images broadcast repeatedly can be as 'seductive', if not more so, to drawing people into participating in an event. It would therefore be mistaken to think of social media as inherently more effective in influencing citizen behaviour as traditional media.

The social media properties of particular relevance to ES and EmerGent, however, would seem to be the speed at which information travels via social media and the (potential) reach it can have. Reach is important for two reasons. First, the distributed nature of social media communication means citizens'

need for information in a crisis can be met more quickly, and potentially, more accurately and in a targeted way, than through print media and associated online news and television. Citizens taking up roles as 'helpers', 'informants' or even 'citizen journalists' are able to broadcast information on the event in real time thus satisfying the need for up-to-date information (or, on the negative side, increasing panic). However, not all tweets have the same status and impact. 'Credible voices' and those with many followers are important for spreading a message quickly. Second, authorities / ES can make use of this property of social media to support the response and recovery efforts.

If the intended use of social media data goes beyond broadcasting information to, for instance, gathering of intelligence to inform deployment of resources, mechanisms need to be found to deal with huge volumes of social media data generated in an emergency – to turn information into intelligence. One particular difficulty in this respect lies in information quality – the extent to which information derived from social media can be trusted. However, the case study suggested the existence of what can be seen as 'self-correcting' mechanisms operating in social media on platforms such as Twitter, where rumours, for instance, appear to be dispelled (reasonably quickly) following a set pattern. Furthermore, work is currently going on to develop technology to identify rumours on Twitter on the basis of particular characteristics or indicators of such tweets. Thus, attempts can be made to identify and respond to such tweets before they go viral "by looking at the news source, the conversations that stem from the tweet and even the tweet's language" [WWW02].

4.2   The possible impact of social media in emergencies

The impact of social media in emergencies is not inherently positive or negative; in fact, it is likely to have both of these effects – and possibly simultaneously. In this sense, social media are not different from any other media or methods of communicating. Indeed, this case study has pointed to the close inter-relationship between social media and other types of media and communication, suggesting that social media are just one technology to facilitate human interaction.

What is distinctive about social media, however, is the speed and scale at which information can travel. This means that the results of social media communication (be they positive or negative) can be felt more immediately and widely than in the case of other means of communication, while the type, nature and scale of effects are inherently unpredictable. Social media, therefore, can contribute to a general atmosphere of 'permissiveness' that can make it easier for people to be drawn into a crisis situation (if they are thus predisposed anyhow).

Authorities and citizens face various opportunities and challenges before, during and after an emergency. These include that social media can (as discussed in section 3.3):

- spread information rapidly about the event and influence opinions (both positively and negatively) about it
- help to coordinate activities of citizens involved in the emergency (both positively and negatively) – including organising disaster relief efforts and coordinating criminal behaviour
- discourage some people from committing criminal acts
- raise money or organise support to compensate those negatively affected by the emergency.

In terms of opportunities, the wealth of different social media platforms offer useful 'fit for purpose' technologies that can harness people's goodwill for constructive purposes / results during and after an emergency as well as ensure that citizens are well informed by authorities about the emergency. Different social media platforms are likely to be used simultaneously and in different ways for these efforts.

In terms of challenges, the unpredictable nature at which information spreads in social media, the volume of information created during an emergency, as well as the high level of 'noise' from repetition and rumors can make it very difficult to turn information into intelligence on which it is possible for ES to act. State of the art technology is likely to help but not completely resolve this issue, as the nature of data (text information) generated by social media is likely to require human sense making abilities.

4.3 About methodologies for researching use of social media in emergencies, particularly around impact

Researching social media has a number of uses besides gleaning useful intelligence on how best to respond to emergencies. Social media sites and applications contain a great deal of information that can lead to a better understanding of what occurred around an emergency or event. Analysis of this information has a series of serious limitations at present. In the first instances, not all platforms are equally able to be analysed. As shown in this report, information about human-created emergencies such as riots is often spread through closed-platforms such as BBM. However, these data are largely inaccessible to both ES and researchers. A key informant interview confirmed this view, indicating that they had no knowledge of in-depth research into the role of BBM during the riots despite the fact that it was this platform above others that was thought to have been used by rioters to coordinate activities. Because of this, access to data has largely guided what research can be done on social media and research has, therefore, tended to focus on Twitter as the most open source of social media data. However, as noted in section 3.2.2, Twitter appears to have different patterns of interaction, demographics and scale in comparison with other closed- and semi-closed-platforms such as BBM and Facebook – the latter, for example, have more users than Twitter account holders in the UK. This means that a focus on Twitter alone to inform an ES response and to research the impact of social media usage during an emergency will only provide a partial picture of the situation.

Avoiding sampling bias in social media sources remains an unresolved problem, and this is not only restricted to which platforms are analysed. For example, two studies [PCKV13, PVV13] on the riots based their searches of Twitter data on hashtag only, which excluded many tweets posted during the riots which did not use hashtags, including tweets by ES. Given the importance of the police during the riots, the focus on hashtags meant that other relevant tweets were omitted from the study.

Typically the studies explored as part of this case study focused on the most frequently retweeted tweets and on accounts with the largest number of followers during the riots. Such an analysis was able to provide a good overview of the scale, patterns and content of many influential tweets, but tended to neglect more small-scale interactions.

Besides sampling issues, we found that applications of computational natural language processing techniques to Twitter analysis (such as sentiment analysis) were currently not sufficiently reliable to analyse and interpret the content of tweets during emergencies. Instead, human input is likely to be required at some stage, particularly when searching and selecting key words or hashtags, and in the analysis of meanings and images contained in messages.

4.4 About the case study methodology in the context of EmerGent

Finally, we have learnt a number of practical and methodological lessons about implementing a case study methodology as part of the EmerGent impact assessment.

It has become clear that using content analysis of key items of literature supplemented by 'expert' interviews are useful core methods for any future case study work. However, our choice of initial case study – the London riots – was a particularly well-documented one due to its social, political and

technological factors (in particular, the use of social media to encourage rioting at a significant scale in several parts of the country). Subsequent case study themes – such as flooding (see section 5.1) or other natural disasters – are less likely to have generated the same level of academic and journalistic interest as this one. This means that the methodological emphasis will need to shift towards more 'field' based methods (interviews, observations) supplemented with more innovative methods, including content analysis of social media data. This is likely to be operationally challenging and will require collaboration – possibly of an interdisciplinary kind – between different members of the consortium.

The London riots case study has also highlighted the challenges and implications of analyzing different types of social media data – accessing more open content platform data such as Twitter is easier than analyzing the use of other more closed platforms such as Facebook or WhatsApp Messenger or BBM. However, as discussed in section 3.2.2, these different platforms may be used by different types of citizens and for different purposes – so that conclusions reached may be biased in favor of a particular segment of society or particular social practice. Thus, in the case of the London riots, Twitter was used for more socially constructive purposes, while BBM appeared to be used for more criminal intentions – although lack of access to the latter meant that such a hypothesis could not be tested empirically.

In addition, the two main methods used for the London riots case study have also thrown up some challenges. First, it has become clear that arranging interviews with ES personnel and police officers in particular, is perhaps more challenging than in any other sector we have worked in. It has therefore proven a rather lengthy process to arrange even a small number of interviews, something that needs to be considered for future case study work especially when there is a greater reliance on interviewing to generate data. 'Recruiting' interviewees via known contacts is likely to be helpful, though not necessarily sufficient, for securing research participants.

Second, the use of a Microsoft Word proforma for the content analysis has proven effective in terms of being able to deal with a range of file formats (Word, pdf) and having a uniform framework to allow collaboration across researchers. However, Microsoft Word is inferior to qualitative software analysis packages (such as NVivo[2] or MaxQDA[3]) in its ability to search, cross-reference and analytical coding – although the latter require more set-up costs in terms of time and buying a license. The use of Word for the London riots case study entailed an extra step of copying and pasting results by theme from across the literature into thematic documents. The next set of case studies will therefore aim to use qualitative data analysis software to carry out the content analysis.

The work on this initial case has shown the multiple case study design to be the correct approach for the EmerGent impact assessment. In particular, it has helped identify a number of hypotheses and topics for further study in subsequent cases – focusing on alternative types of emergencies, particular tools to engage with social media or on particular services using innovative solutions. Hypotheses and topics for further analysis / testing are shown in Figure 5 below.

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[2] http://www.qsrinternational.com/products_nvivo.aspx

[3] http://www.maxqda.com/

- Social media usage: that particular types of social media are more likely to be used by certain demographic and socio-economic profiles for particular purposes
- Social media roles: that citizens take up different roles during emergencies, including informant, helper, amplifier and citizen journalist
- Information quality / rumors: how the mechanism of social media itself can function as a corrective mechanism for false rumors or speculation (i.e. using crowdsourcing)
- Scale of social media data: turning information into intelligence is more challenging during extreme events resulting in millions of tweets and other social media data in a short period of time
- Organizational and professional obstacles or facilitators to enhancing the use of social media data in emergencies.

Figure 5: Hypothesis and topic for further investigation

5   Next steps

5.1   Next case studies and rationale (including partner involvement)

As discussed in section 2.2.2 above, Work Package 2 Deliverables 2.2 to 2.4 follows the multiple case study approach, in which subsequent cases are used to provide evidence to inform the Theory of Change and to explore, confirm or disprove patterns or hypotheses developed in previous case studies.

The first case study reported in this Deliverable (D2.2) has been used to develop research tools for subsequent case studies (see Appendix A and B) and initial hypotheses of the use and impact of social media by ES before, during or after emergencies – in this particular case civil unrest in the form of the 2011 London riots.

It is proposed that the next round of case studies (reported in D2.3) will apply an adapted methodology to another type of emergency – a natural disaster. The most suitable type of natural disaster for this purpose appears to 'flooding', as there are several examples of such incidents over the last few years in all partner countries, including for example the June 2013 Elbe basin river floods and the 2013/2014 Somerset Levels floods in the UK. The case studies will be led by partners in the relevant countries, including Germany, Poland, Italy and Norway.

The aim of these case studies will be to apply the research tools, including content analysis and interview frameworks, to a different type of emergency and to explore the use and impact of social media in these different contexts. It is also proposed that other innovative research methodologies are applied to these case studies to deepen and extend relevant findings, as discussed in Deliverable 2.1. These are likely to include the collection and analysis of social media data using either or both qualitative and quantitative content analysis techniques, as well as social network analysis.

5.2   Updated Theory of Change

As described in Deliverable 2.1 [CSJD+14], a key feature of a Theory of Change methodology is the need for it to be updated as the project develops. This includes the need to involve all consortium partners to discuss and agree the emerging Theory of Change and metrics – including agreeing the expected outputs, outcomes and impacts of EmerGent. To this end, the Tavistock project team designed an online survey (using SurveyMonkey[4]) to explore the EmerGent consortium partners' views on the likely outputs and outcomes of the project. A summary of the findings from the survey based on 16 responses from all partner organizations (with the exception of Tavistock Institute staff) received between 19th September and 10th October 2014 will be shared with all partners – discussions on these, alongside a consideration of the main findings from the London riots case study, as well as other deliverables documenting more recent emergencies in D3.1 [RLFM+14] and D3.4 [unpublished] will be used to review and update the Theory of Change following the principles outlined in section 2.1.

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[4] https://www.surveymonkey.com/

6   Summary

This Deliverable develops and applies the concept of impact assessment resting on a Theory of Change model presented in D2.1. This is done by applying it to a particular case study – the 2011 London riots – as an initial iterative example of the use of social media in an emergency.

6.1   Methodology for Task 2.2 and Task 2.3

Section 2 sets out the overarching case study methodology for this and subsequent deliverables, with section 2.1 providing a link between Tasks 2.2 and 2.3 and Deliverable 2.1 and the Theory of Change. Section 2.2 discusses the methodology for the case study work in Work Package 2 generally and how it was applied to the London riots case. With the key purpose of the case study work being to capture more detail about the use of social media in emergencies that can then be fed back into EmerGent, a multiple case study approach allows for a successive confirmation or discarding of hypotheses developed in the initial cases. In these successive waves of case studies, the first one (presented in this Deliverable) is about scoping the domain knowledge and testing the case study methodology. Issues and themes highlighted will be explored in more detail in successive case study waves. The London riots case was chosen because it is well documented and thus allowed us to meet all of these objectives before progressing to emergencies that have attracted less research interest. The case studies are implemented with the following methodological mix: a qualitative content analysis of documentation about the case and interviews with key organizations and stakeholders; additional field research. This present case study about the London riots has focused on the first two methods, with additional field research, as well as content analysis of social media data, envisaged to be implemented in the next case study rounds.

6.2   The London riots case study

Section 3 presents the London riots case study, by analyzing the evidence available from the literature and experts on the role social media played during this emergency. Section 3.1 presents the socio-political context and background within which the disorders of summer 2011 took place. In doing so, it sets the scene for the discussion of the role social media was found to have in this event which takes place in section 3.2. Here, we discuss the types of social media platforms that were used by citizens and ES during the riots, making a distinction between open and closed platforms. We then progress to discuss usage patterns, by exploring the roles citizens took up on social media platforms during the riots and discussing how authorities (in particular the MPS) and media made use of these technologies. Section 3.3 then moves the discussion on from exploring use to looking at short and longer term impacts of the use (or non-use) of social media. We suggest that social media had both negative effects (spreading information about the event and influencing opinions negatively, supporting the spread of the riots themselves and helping coordinate activities of rioters) and positive short-term effects (discouraging some people from participating, organizing citizens in cleaning up the damage, raising money to compensate those negatively affected). Longer term effects were observed mostly at the level of the MPS that, acting on the experience of the London riots, put in place a number of organizational and practical changes in how they used social media in daily operations (in and outside emergencies).

6.3   Lessons learnt

Section 4 draws out the lessons we have learnt from the analysis of the role of social media in the London riots of 2011, and their relevance for EmerGent. Key lessons about the use of social media in emergencies (section 4.1) include: the need for ES to be aware of audience, message content and tone when communicating on social media platforms; social media having an influencing role on citizens' behavior in emergencies alongside other media; the importance of 'credible voices' and those with many followers to

spread social media messages quickly and widely; the existence of a self-correcting mechanism on Twitter where verifiable rumors are fairly quickly denied. A key lesson learnt from the analysis of the data on the London riots (as highlighted in section 4.2) is that the impact of social media in emergencies is not inherently positive or negative, but that the speed and scale at which they allow information to travel in an unpredictable manner creates specific opportunities and challenges for citizens and authorities when it comes to preventing, responding to and recovering from emergencies. Section 4.3 discusses methodological learning about researching social media. The London riots case has shown that learning about the role of social media in emergencies has possibly been limited by difficulties of researching closed social media platforms such as BBM. Sampling Twitter messages by hashtags leads to potentially large volumes of tweets being discarded and may therefore only deliver a partial picture of how social media is used in emergencies. Finally, technology is not at present sufficiently sophisticated to analyze social media content and needs to be complemented by human efforts. As regards the case study methodology (section 4.4), the work on the London riots has confirmed that interviews and literature reviews are useful core methods, though the next case study waves are likely to place more emphasis on primary data collection through fieldwork and analysis of social media feeds themselves. The next case studies also provide an opportunity to ask more specific research questions and to investigate some of the themes that this present case study has highlighted as relevant, such as the use of crowdsourcing, rumor generation and dispersal and organizational and professional obstacles and facilitators to enhance the use of social media in emergencies.

6.4 Next steps

Section 5 discusses the next steps for Tasks 2.2 and 2.3. This will involve applying the case study methodology to another type of emergency, most likely a natural disaster like flooding, as well as updating the Theory of Change map presented previously in Deliverable D2.1 [CSJD+14] following the principles outlined in section 2.1.

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Appendix A: Coding frame for content analysis

Template compiled by:

Choose your organisation

Title of document and author	
Type of document	Click to choose a document type
Source (where the information came from, e.g. if book chapter title of the book, if website give ULR)	
Date of publication	Click here to enter date of publication.
Scope of the publication	Click to choose the scope
Audience for the publication	
Relevance for the case study	Choose relevance.
Summary description of the content of the document, with particular regard to how role of SM is discussed (no more than 200 words)	

	Text from document, including page numbers (phrases or paragraphs)	Finecoding plus summary (fine codes are listed)
Context before the emergency took place		
Types of SM users		
Type of SM technology used		
Type of content (information) shared with what SM technology		
Motivations / drivers for using SM (by type of SM user and type of SM technology)		
Barriers to use / 'dis-motivations'		
Intended audience and reach (e.g. number of tweets or re-tweets, facebook likes, …)		
Other audiences reached (including reach, e.g. number of tweets or re-tweets, facebook likes, …)		
How was the content used, by whom?		
Intended effects / results of SM use		
Achieved effects, including unintended effects / results of SM use		
How EMS communicate with citizens		
How citizens communicate with EMS		
How citizens communicate with citizens		
How EMS communicate with EMS		
EMS responses to the emergency due to Social Media		
Citizens' behaviour in emergency due to Social		

Text from document, including page numbers (phrases or paragraphs)	Finecoding plus summary (fine codes are listed)
Media	
How Social Media impacts on EMS organisations (people and processes)	
How Social Media impacts EMS IT systems / use of response technologies by EMS	
Lessons for EmerGent	
Potential interviewees (name and job title)	

Appendix B: Key informant interview framework

Interviewee name:

Organization:

Date of interview:

Explain focus of study:

EmerGent focuses on the impact of social media data on emergency services before, during and after emergencies (see http://www.fp7-emergent.eu/). As part of this, the project aims to develop new ways to help citizens to share information with emergency services during emergencies and for emergency service staff to access information from social media in more manageable and practical ways – by utilizing e.g. innovative data mining approaches.

At this stage of the study, we are exploring the way social media was used in previous emergency situations to understand:

- How it was used – by different people before/during/after the emergency?
- How, if at all, emergency services (such as the police, ambulance, fire brigade, or ….) made use of social media data during the emergency?
- What impact it had – both positive and negative – on what they did or how they responded to the emergency?
- What other impacts the use of social media had?

We are starting by looking at the UK riots in 2011 but will also look at other emergencies, such as the floods in 2012 or 2014 ….

Informed consent:

Make it clear to interviewee that:

(a) their participation is voluntary and that they are free to withdraw from the project at any time without explanation;

(b) the EmerGent project is for the purpose of research and not for profit;

(c) any identifiable information about them which is gathered in the course of and as the result of them participating in this project will only be (i) collected and retained for the purpose of this project and (ii) accessed and analysed by the researchers for the purpose of conducting this project;

(d) their anonymity is guaranteed and they will not be identified in publications or otherwise without providing their express written consent.

Introduction		
Main Question	**Supplementary questions**	**Prompts**
What is your knowledge and experience of the UK riots?	What research have you been involved in? What did it focus on? Have you done any research on use of social media during riots? What was your first had experience of the riots?	
What has this shown you about the riots?	What has it shown you about the use of social media during the riots?	

Theme 1: Use of Social Media during UK riots in 2011		
Main Questions	**Supplementary questions**	**Prompts**
In what ways and by who was social media used during the UK riots in 2011?	What types of social media were used? What else was used? (internet, texting, …) Who used them (age, gender, etc.)?	Clarification of responses: So what you are saying is … Can you give me more detail on.. Can you give me an example of ..

Theme 2: Use of Social Media by Emergency Services during the UK riots		
Main Questions	**Supplementary questions**	**Prompts**
How, if at all, did emergency services use social media data during the UK riots?	What emergency services/other organizations? What did they do with this information? Did it influence their response? What other impacts did it have on them?	
How, if at all, did emergency services use other types of data during the UK riots?	What emergency services/other organizations? What did they do with this information? Did it influence their response? What other impacts did it have on them?	

Theme 3: Impact of Social Media during/after UK riots

Main Questions	Supplementary questions	Prompts
What is currently known about the impact social media had during the UK riots?	What are the key conclusions emerging from research? How credible are these conclusions? What is the evidence base?	
What impact did social media have on emergency services before/during/after the UK riots?	Did it affect their response to the riots? Did it affect them in any other way?	Why? In what way? Do you have any evidence for this?
What other impacts – positive or negative did social media (or other related things) have?	Who or what difference did it make?	Why? In what way? Do you have any evidence for this?

Theme 4: Examples of relevant studies

Main Questions	Supplementary questions	Prompts
Are you aware of any other studies which have explored the impact of social media during the UK riots?	What did those studies focus on? What conclusions did they reach?	
Are you aware of any other studies focusing on the impact of social media on other emergencies?	What did those studies focus on? What conclusions did they reach?	

Theme 5: Suggestions for subsequent analysis of material.

Main Questions	Supplementary questions	Prompts
Can you suggest specific literature and other material we should analyze in more detail to		

understand the role of social media in the UK riots?		
Can you suggest other people we should talk to in order to understand the use and impact of social media during the UK riots?	Can you suggest other academics or experts? Can you suggest other Emergency Service staff or organizations? Can you suggest anyone else?	Do you have their contact details (name/tel/email)? Ask for introduction/referral
Which other examples of emergency situations would you highlight to illustrate the impact of social media?	What are your the reasons for selecting these examples? Would you say the learning from these examples is transferable to any emergency situation?	
Can you suggest people to talk to about other relevant emergencies, such as the 2012 or 2014 floods?	Can you suggest other academics or experts? Can you suggest other Emergency Service staff or organizations? Can you suggest anyone else?	Do you have their contact details (name/tel/email)? Ask for introduction/referral