

COBACORE

Community Based Comprehensive Recovery

Grant Agreement N° 313308

D1.2 State-of-art, trends and opportunities

WP1 : Domain analysis, scope and requirements

Version: 1.0

Due Date: 30-9-2014

Delivery Date: 30-9-2014

Nature: R

Dissemination Level: Internal

Lead partner: Tilburg University

Authors: Marijn Rijken, Reinout Pieneman, Kenny Meesters

Internal reviewers: Marc van den Homberg

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This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 313308.

Deliverable Title	State-of-art, trends and opportunities in damage and needs assessments in post-disaster environments
Deliverable Number	D1.2
Keywords:	State-of-art, trends, opportunities, current processes, alignment, technology, user interaction, adoption strategy

Executive Summary:

Deliverable 1.2 describes the current state of the art of the domain earlier described in Deliverable 1.1. Building on the concept introduced, the three main groups of 'users' (affected population, responding community members and the responding professional organizations) and the subsequent interactions further research has been conducted. While the concept illustrates an innovative and new way to design the disaster response and recovery process (mainly by its comprehensive element i.e. the integration of these groups) there are certain elements that can be found in existing procedures and tools. As these groups are at the core of the COBACORE concept we examine the state of the art by taking a closer look at these groups. Specifically we examine how each of these groups currently interacts within their group, and with the other groups. We examine these interactions not only their technological aspects but also their supporting procedures or the absence thereof.

In the analysis of the state of the art we have drawn on sources from the various case-studies that were introduced in Deliverable 1.1. In conjunction with the case studies we have also engaged with several of the supporting partners from the COBACORE project to verify, as well as use the results from the partial evaluations to learn more about processes of the various groups. Finally input has been included from various partners collected through surveys along with own research into various other initiatives, tools and innovations that have overlapping objectives with the COBACORE concept and project.

Through this analysis we have been able to identify, analyze and map the current processes and forthcoming developments. The results have provided three categories of conclusions. First we have been able to identify key requirements in the design process to consider integration between the developed COBACORE concept and the existing processes, aiding in the adoption of the platform. These are mainly focused on the professional organization, and include considering the fit with the organizational processes and responsibilities within the organization. Second the analysis shows how other initiative and developments align with the COBACORE concept illustrating potential collaborations or alignments such as the OPSIC project (see D6.4). Finally the analysis shows gaps between the concept and the current tools, procedures and methods, These gaps provide opportunities to improve the impact of the COBACORE project and adding unique features and functions, for example by facilitating communications between the groups via existing channels.

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2 Introduction

Deliverable 1.2 is the result of the work conducted by the consortium in the first 18 months of the **Community Based Comprehensive Recovery**-project (COBACORE). While formally the responsibility of the work package 1 (WP1), the deliverable presented here is based on the input work and analysis from all partners and consortium members. In this first deliverable (D 1.1) the COBACORE concept has been introduced and described. This concept has been the subject of further research within work package 1, namely to examine if and how the various aspects of the COBACORE concept are currently implemented by the potential users of the platform. The overall COBACORE concept as described in Deliverable 1.1 described various groups that play a role during disaster response and recovery: the affected population, the responding community and the responding professionals. For each of these the characters and the (desired) interactions with the other groups has been described. This input has been used by other work packages and has laid the base for the intermediate design (WP3), prototype (WP4) and evaluation (WP5).

The combined work from all the work packages over the past year has yielded a consistent, comprehensive and clear vision of the COBACORE concept. Building on the concept outlined in the aforementioned deliverable, the COBACORE concept has been developed into a common vision on the community-driven disaster response and recovery. With the specific emphasis on the community not only as the driving force behind the articulation and verification of the needs but also the main source for providing relief and addressing those needs. This vision -a community centered disaster response and recovery operation- has been embraced throughout the consortium and translated into specific design elements of the project. From the vision several objectives of and interactions between each of these groups has been defined. This has in turn resulted in several high-level functions that the COBACORE platform, resulting from the vision as a medium between the groups, should be able to provide. These have been further refined and specified in Work Package 3, resulting in a design for the platform which has been developed in Work Package 4. Finally the platform, along with the concept has been tested and verified by Work Package 5. More details on the design, development, intermediate tests and the progress of the platform creation can be found in the deliverables of each respective WP.

Most of the work so far, as illustrated above, has been focused on refining, building and verifying the concept and platform envisioned by the consortium and denoted by work package in the previous deliverable. However a key element in ensuring the added value, the marketability, adoption and positive impact (contribution) to the disaster recovery process and the involved groups, is to examine the envisioned concept and platform development in the broader context and the current state of disaster response and recovery operations. Examining which elements and aspects of the concept are currently in place, which are under development and which are already existing allows the project to embed its project. Furthermore it enables the consortium to identify gaps which may require specific attention when disseminating the final product or even provide opportunities, improvements and features enhancing the platform and concept. This state-of-the-art analysis on the technological aspects of the COBACORE platform but also examines the existing organizational structures, procedures and methods that currently exist or are indeed missing. The state-of-the-art analysis presented here provides an outward look from the COBACORE concept to the involved communities and the practices, tools and structures.

 *The contents of this document as well as the state of the art itself are built on research, involving various stakeholders, the analysis of cases, results from knowledge accumulated over the course of the project and partial evaluations with representatives of the mentioned user groups. While this approach ensures a well-considered and grounded concept, described in this document future insights and evaluations might suggest further refinements and/or additions to this concept.*

2.1 Objective

The objective of Deliverable 1.2 is to conduct a state of the art analysis. In this deliverable we examine the state of the art of the underpinning concepts of the COBACORE project. The previous deliverable (D1.1) has focused on examining past cases, engaging with several members of the various communities involved in disaster response and studying the trends in recent disasters. This research and analysis has provided a clear concept and vision for COBACORE, building upon trends and opportunities identified for the representative communities. A design process has followed on this aspect, building on the concept and deriving various functions and features that should be available for to communities, based on a deductive analysis from the concept. The following intermediate evaluation has enabled verification of this ‘translation’ from concept to prototype (and inherently the concept itself).

In the state-of-the-art of analysis, presented in this document, we examine the domain using the concept as the starting point. However in this analysis we have a more outward look. We take the various elements that make up the concept and examine which of these elements currently exist, in what form and how these can improved or integrated. In other words, rather than translating the elements of the concept to an implementation according to our research we examine how these elements are implemented by others. The result, and thus the objective of this analysis and this deliverable, is to demonstrate the added value of COBACORE, identify gaps that should be addressed in order to ensure adoption by the potential users and find collaboration opportunities and partners to align our development, research and dissemination activities with. The objective of the analysis is to assess the ‘landscape’ of the COBACORE concept, its underlying assumptions and its implementation in the current concept.

2.2 Scope and approach

In order to examine this ‘landscape’ we take a comprehensive view to the various elements of the COBACORE concept, in particular the interactions within and between the groups. We are not focusing solely on the tools (information technology) but rather on information systems, including the organization, process, methods and other aspects. Specifically for each group of the COBACORE concept we first examine the organizations and structures within that group. This examination focusses on how a specific group is organized, what –if any- command and control structures are in place, what their mandate is and their responsibility towards other organizations and groups. Next we examine the processes that are in place as well as methods, answering if and how a group engages and continues to interact with other groups. Finally we also look at the tools and technologies used to (potentially) support these process. This examination is draws on the results from the previous case studies, the partial evaluation conducted by Work Package 5, the accumulated knowledge by the partners over the past 1.5 year of the project and own research conducted by the Work Package 1 members.

The document structure follows this approach. In the next section we illustrate the links between the analysis presented in this document and the overall COBACORE project, as well as the other documents within WP1 and the deliverables of other work packages. In the next chapters we examine the elements of the COBACORE concept for each of the three user groups: the affected community (chapter 3), the responding community (chapter 4) and the responding professionals (chapter 5). For each of the groups we examine the aforementioned aspects: the organization and structure, the processes and procedures and the technology, tools and initiatives that are used by or focus on this group. In addition we examine how several of the introduced aspects, specifically: interactions, are implemented in other sectors, such as service organizations in the commercial sector. We end by listing the various results of our analysis and how these align with or can be incorporated and/or implemented in the further development of the COBACORE project. Finally we present our overall conclusion of this analysis.

2.3 Relation to project and work packages

This document aims to provide the consortium with an analysis and set of recommendations of the COBACORE platform focusing on the current state of the disaster response and recovery domain in relation to vision. The outcomes will help the various work packages to align their work not internally (the objective of deliverable 1.1) but rather to align the work with the ‘world’ outside the COBACORE project in various aspects. The concept outlined in this document is intended to establish how COBACORE fits in the current landscape of the disaster response and recovery. Deliverable 1.2 aims to provide the partners in the COBACORE consortium, and other stakeholders, with a clear understanding of the domain of community driven disaster response and recovery. In addition, based on the analysis several general recommendations are identified, along with various requirements to consider to ensure adoption and improved impact. The outcomes will benefit other work packages in various ways. (see *related documents*).

2.4 Related documents

There are several related documents, on which Deliverable 1.2 is built or provides input to. The following documents provide more details and insights on the various sections introduced in the document. For more details we refer to these specific documents.

2.4.1 Internal WP1 documents

- **Deliverable 1.1: scope, requirements and definitions**

This document describes COBACORE concept and the various end-level perspectives: the individuals from the affected community, volunteer-driven responding organizations and the professional responding organizations. For each of these levels the document details the potential benefits the COBACORE platform could provide, how to incentivize that level and the desired (high-level) usage expected. This document forms the base of the project.

- **State of the art (technology)**

This document explores the tools, methodologies and practices currently employed. The goal is to identify what initiatives are in place and how these initiatives are related to the COBACORE project. The outcome will help to assess with which systems and to what extend COBACORE can align with the existing tools. This state-of-the-art analysis focusses specifically on (initiatives on) tools and technologies used in disaster response and recovery.

- **Case descriptions**

The cases presented in this document are initially a descriptive account of several disasters that have occurred and have been studied over the past decade. These cases will be used in further research to uncover the more detailed analytical requirements, to verify the direction and functionality of the COBACORE platform and to demonstrate the value COBACORE potentially provides. The case studies are used specially in this document to identify current practices, organizational structure and mandates as well as processes utilized.

- **Milestone 1.1 and 1.2**

This intermediate documents outline the COBACORE concept as a platform, method and tool for comprehensive recovery. The documents contain information on the processes that are used by the various user groups. Furthermore the milestones provide additional input on the incentives and motivations of each of the user groups. Finally the milestones provide (high-level) requirements that are derived from the overall concept and vision and used in the further design of the COBACORE platform.

- **Survey among partners**

Many of the partners in the project have increased their domain knowledge in the past 1.5 year. Either as a specific assignment in the project, indirectly by engaging with others or via the knowledge present in their organization. A survey has been conducted among the partners of the COBACORE project to capture the tacit knowledge about the current processes, tools and organization. The survey and its approach can be found in the appendix.

2.4.2 Deliverables

In addition to the internal documents from Work Package 1, this deliverable also includes input from the (underlying discussions and work of) deliverables of other work packages. In particular D1.2 has a strong –mutual– connection with the following deliverables.

- **D3.1 Functional behavior**

From the issues and functions presented in this document we distill the various functions that the platform is required to provide in order to address these issues and take advantage of the potential of the COBACORE concept. The deliverables from Work Package 3 describe in more detail how these functions work. These should align with the existing procedures and organizational structures to ensure the platform is adopted. The analysis will examine is expected, are currently lacking or could provide an additional value. The interchange with Work Package 3 will improve the validity, adoption and value of the platform.

- **D4.1 Platform requirements**

The platform requirements outline the capabilities of the platform needed to provide the functions and details. This includes for example the underpinning technical infrastructure and the abilities the platform should provide in terms of user interface and interactions. We need to examine if these requirements not only in themselves make sense and satisfy the users' needs, but also do this considering a more comprehensive setting and deployment.

- **Partial evaluations & tacit consortium knowledge**

The partial evaluations provide important input to understand the current state of the art for the affected community, the responding community and the responding professionals. The conducted interviews provide insight in the motivations or mandates of the groups, the processes followed and the tools utilized. In addition we have captured (through interviews and survey) the tacit knowledge present in the consortium regarding the current state of community driven disaster response and recovery. This can be contrasted with the vision of COBACORE and key differences can be found that either provide an unique value, need to be designed and/or examined further in order to ensure COBACORE becomes a viable, value adding platform for these groups.

- **D5.2 Intermediate evaluation**

The intermediate evaluation has been used to verify the concept, and the prototype platform with several representatives of the various groups of the COBACORE concept. From this intermediate evaluation several key questions have risen about the integration of the COBACORE platform with the existing organizational structures and procedures (for professional responders) as well as individual interactions with the platform (for affected community members and responding communities). These questions are (partially) examined in this analysis. Vice versa the analysis provides additional important requirements to be considered and tested, for example to ensure alignment with existing procedures or engaging with ‘unbound’ volunteers.

- **D6.2 Report on exploitation opportunities.**

The state of the art analysis presented in this document also provide a direction for the dissemination and use of the system. Specially the identification of the (potential) users, stakeholders and the incentives to adopt the system. Along with the identified added value the outcomes aid in identifying opportunities for exploitation. Specifically the state of the art analysis will help to improve the chances of adoption by potential launching partners. Furthermore gaps found between the current practice and the COBACORE project will help to demonstrate its unique value, along with the added value by linking to existing processes and structures.

2.5 User groups

Deliverable 1.1 outlines the COBACORE concept based on the domain analysis conducted in Work Package 1. From this analysis specific attention was given to the involved actors in the disaster response operations. While many different persons and stakeholders can be identified, they can be classified in three major groups, based on their background and relation to the disaster. The first group are the affected communities where the people are in need and have a demand for supplies and services. Second there is a group of professional responding organizations, varying from local emergency organizations to government officials. The third group are the spontaneous volunteers (the responding community) including for example people close to the affected area or supporting the relief operations remotely, providing relief, supplies and services to the affected community. These three groups, overlapping to a certain extent, can jointly make a significant contribution to aiding the affected community not only in their direct and most urgent needs but also providing certain skills and resources to rebuild the stricken communities. A strong connection between the involved parties, facilitated by information and knowledge exchange, improves the efficiency and effectiveness of disaster response and recovery operations.

From the analysis we conclude that there are significant opportunities to further take advantage of the resources and skills of spontaneous volunteers and responding communities, the capacities existing in the affected community and the resources of the professional organizations. However, in order to tap into this potential and bringing the different involved stakeholders together, interaction will have to be facilitated. Among these interactions is the situational awareness, an overview of which parties are involved in the operations, to what extent, where they are operating and what their capabilities are, but also an overview of the needs of the affected community. Next communication between these involved parties should be facilitated, allowing the various stakeholders to inform each other. Such communications also enable the redirection or mobilization of resources to areas in need. Finally strong connections between the involved stakeholders also enable professional organizations to build additional capacity among the affected and responding communities for example by training.

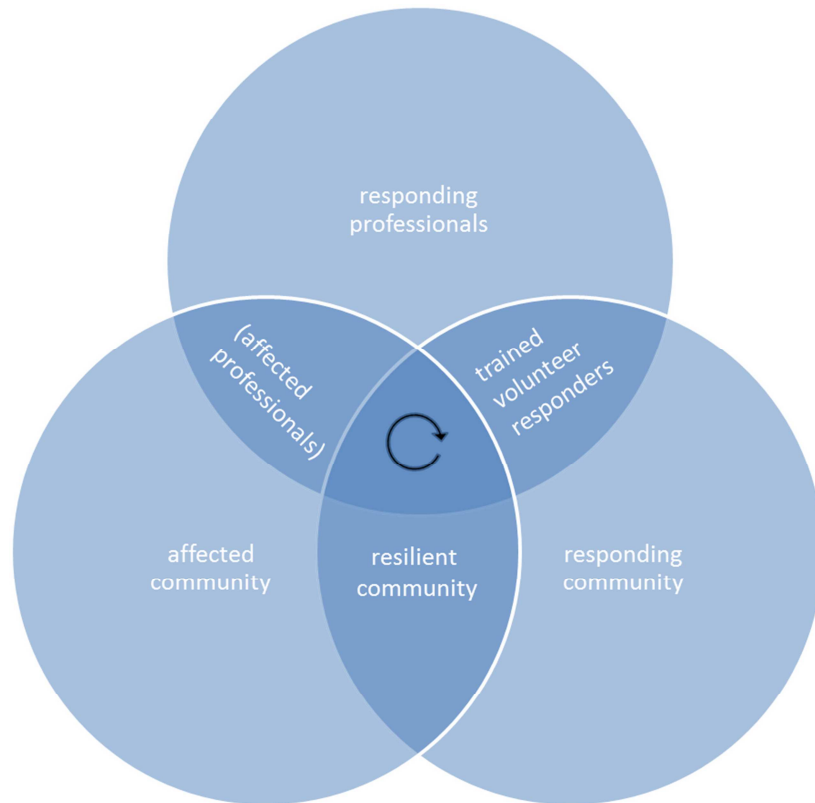


Figure 1: COBACORE user groups shown in a Venn diagram

3 State of the Art – Affected community

We first examine the state of the art for the affected community. We use results from the research within WP1 along with the knowledge gained from the earlier mentioned sources. Since the affected communities differ greatly between the disasters, countries and cultures we introduced a case-study, examined in the partial evaluations, to illustrate several elements on the organizational, procedural and tool level to be considered in the further development and dissemination of the platform and concept.

3.1 Organization

What the needs of an affected community are, and how they react on a disaster will differ from location to location and from disaster to disaster. Factors that influence the affected community's needs, their expression of these needs, their coping skills and self-organization in response and recovery are, among others: type and severity of the disaster, whether or not the community has had previous experience with similar disasters, whether or not the community is prepared, geographic scale and duration of the disaster, safety situation, type of area affected (such as small town or big city), demographic figures (age, economic situation, ..), social fabric of the community, culture and expectations on help coming from the own government and/or foreign agencies, applicable laws and regulations, insurance policies, etc. It is therefore not possible to provide a description of a "typical" affected community. Instead, we discuss a case of an affected community suffering from regular floods, and their new coordinated and integrated approach to dealing with floods. While the approach is not very advanced in terms of the use of ICT's and social media, the organization of the recently established local flood committee could be called state of the art, appears to be effective, and could serve as a best practice for other affected communities. Unfortunately, floods continue to occur in many areas throughout Europe, with many similar types of communities affected.

3.1.1 Case study Skibbereen Flood Committee, Ireland

The affected community discussed is Skibbereen, a small town in the county Cork in the south of Ireland. The town is located around the junction of two rivers. Skibbereen suffered severe flooding in November and December 2009, in which 220 properties were flooded and 6.5 million Euro damage was caused. Prior to this, the most severe flood event affecting Skibbereen occurred in August 1986, as a result of Hurricane Charley. Other recorded flood events in 1969, 1974, 1975 and 1982 were less severe. Before 2009, no coordinated or integrated approach to flood prevention and disaster management existed. After the 2009 floods a local flood relief group, called Skibbereen Floods Committee (SKC) was founded, linked to the National Flood Forum. Skibbereen was flooded again only recently on 25th October 2013. The notes below are taken during a workshop with representatives of the Skibbereen Flood Committee held on 6 March 2014. The workshop was conducted by consortium partner Future Analytics Consulting. See separate "Summary report". The main observations and lessons learnt from this case study are:

The committee is led by a town engineer and consists of the Flood Committee, Coast Guard, Garda, Fire Brigade, Cork County Council, and is heavily mooted and promoted by the local Flood Volunteer Network. The affected community have had weekly meetings for the last 2.5 years – and not a single weekly meeting has been missed, because of the commitment needed, even when risk of flooding was not significant. The community has setup a bottom-up flood defense and management initiative: community engagement and demand action. There are several lessons learned in regards to the organizational structure:

- With the community there has been acknowledgement that the community needs to take on more responsibility (and not asking “where are my sandbags” when they should be going out there and find a solution). From their experience, the professional responders are more inclined to work with a PROACTIVE community. Learning by doing – plan for the future.
- The affected community expressed a frustration with the traditional ‘silo mentality’. The in 2009 established integrated approach addresses this problem
- The Skibbereen affected community strongly advocates the establishment of a structured local representation. Having a local response effort such as a local flood response committee makes a big difference and “places some shape on local recovery”. Helps people get assistance.
- The community acknowledges the limited resources available and looks to empower themselves. However, they wish to see available resources prioritized appropriately, e.g. get the sand bags where they need to be; have a coordinated response and an advance plan. They praise the Civil Defense, who first go to the vulnerable groups. The community appreciates that this is key priority, to assist high-risk groups.

3.2 Processes and procedures

In recent years, the world has been hit with a series of big natural disasters, from Hurricane Katrina in New Orleans, earthquakes in Haiti and Asia, the Tsunami in Indonesia and the earthquake and Tsunami in Japan. Social media has played a great part in disseminating information about these disasters by allowing people to ask for help and presenting volunteers and officials with the tools to provide this help. Social media has made a difference before, during and after these catastrophes by providing easy accessibility. This proved effective following the earthquake in Japan where tweets to Ambassador John Roo got help to transport injured patients from Kameda Hospital.

During the earthquake in Haiti, social media users were used as a base for volunteers by Ushahidi, a piece of software that allows digital volunteers to create maps for first responders in a disaster zone. Skype was also used to coordinate relief efforts. The Marine Corps, the Coast Guard and The World Food Program have also used Ushadidi in several disaster response efforts. After the disaster hit in Japan, Ushahidi was used to create the largest crisis map to date with over 8,000 reports received via social media about shelters, food stores, cell phone charging centers and road closures. Emergency relief agencies such as the Red Cross also maintain Twitter accounts and use them to disseminate information to the public, such as how volunteers can help and where to get shelter and aid following a disaster. The results of a recent study released by the Red Cross showed that the public is now seeing social media as an important medium to communicate with their friends, families and colleagues as well as to seek help before, during or after an emergency situation.

More specifically, other than some general apps and websites (see next paragraph) no apps are available to the public which connect different affected groups prior or during a crisis itself. Communication between affected and responding communities takes place via the iamsafe.nl website, but no operational tools currently exist which actively incorporate a needs and capacity overview for both affected, responding and professional groups.

3.2.1 Processes, practices and information in case study

In the earlier introduced case study several common practices and methods have been identified. While the specific processes, practices and information needs may differ greatly between the different affected communities, the case study shows that there are indeed processes present with the communities. These processes have to be considered and aligned with the COBACORE platform in order to ensure adoption.

- On alert, this team (mostly volunteers from affected community) monitors flood related factors and indicators (wind direction, rainfall, air pressure, tide levels, etc.).
- The affected community ‘managed’ to tap into the Environmental Protection Agency water level sensor to use it as a ‘warning’ of high water levels. Weather forecasting needs to improve and be communicated to local communities.
- Information from local authority has improved, but still imperfect. Local knowledge, e.g. about elderly people, is essential – household visits and cross checking with census is necessary.
- Simple information requirements: checklists, safety codes, establish a register of electricians that would volunteer to check household supply after flood event (so residents are not electrocuted), establish a fund to encourage ‘volunteering’ “at cost”, remove red tape hoops.
- A big issue is lack of awareness – e.g. the flooding is compounded by truck drivers using flooded roads and ‘washing waves’ up into residential premises as they pass through flood waters on the road outside. – Law enforcement should close off certain routes, or minimize type of vehicles using these routes.
- Major information gap around Health and Safety. Extends not only to cleansing your home after a flood event (i.e. cleaning silt away does not address bacteria issues and ‘invisible’ threats to health), but also to understanding of actions. E.g., the affected community strongly called for a flood release barrier at a reservoir, but did not appreciate/know that this simply would not improve the situation. Need to develop health and hygiene promotion awareness and activities among affected communities. Education in community based health concepts...
- Insurance: biggest problem and hindrance to recovery – 3.5 months out of homes pending negotiation and assessment of insurance claim.
- With regard to supplies, provision is not a major concern, although from a business perspective supplies can get pretty low, which can make it difficult to sustain the business during flood events, not least given the reduced customer base. Spend locally especially during crisis to support the community.
- The “adrenalin factor” can go quite stale very soon after a flood event begins to scale back. Only the few local “champions” maintain a commitment to improving the future situation.

3.3 Technology, tools and initiatives

Different platforms exist that help to facilitate the aforementioned interactions. A number of apps and platforms help to strengthen the individual capacities of people prior to a crisis, but also help to establish an informal, regional network that enables a more targeted response among local communities when a disaster actually strikes.

3.3.1 Type of communication/tools used in case study:

Examining the tools and communication facilities used in the earlier introduced case study we find several lessons learned and important elements that should be considered when developing technology, tools and communication options for the affected community:

- The committee meets 1 hour before flood, every 2 hours during flood events
- Word-of-mouth essential locally
- The affected community sets up an SMS text service to warn registered users (150) of risk of flooding. Over a period of 3-4 months, approx. 9-12 texts by County system – the committee administers these and does not issue all texts to registered users – they filter them to localized context – so only what is critically important to Skibbereen specifically. Generally, as soon as a citizen receives the SMS alert, more often than not they will call a local member of the Skibbereen Floods Committee for advice.
- As a relatively small community, face-to-face communication is important, public bulletins are used, occasional flyers, the text alert service (150 people registered via word of mouth), public meetings advertised and attended.
- Door-to-door visits by the local ‘champions’ – volunteers aware of the personal challenges faced through personal experience, and engaging with their affected community, their neighbors, etc.
- An online platform, dashboard or interface is all well and good, and useful, but keep in mind that elderly people do not use smartphones, and do not use the internet (typically). Not all communities have a local radio station (so regional news may not assist listeners in locality), elderly need traditional communication means – notice board, bulletins, ‘pen and paper’.

name	why	what	who
FEMA apps	General ways for people to get involved before and after a disaster	Preparedness information for different types of disasters, an interactive checklist for emergency kits, a section to plan emergency meeting locations, information on how to stay safe and recover after a disaster, a map with FEMA Disaster Recovery Center locations (one-stop centers where disaster survivors can access key relief services) and Shelters	General public
Red Cross apps	Prepare for and mitigate effects from disasters and individual crises (tornado, first aid, earthquake, flooding, pet first aid etc.) i.e. Get notified when an earthquake occurs, prepare family and home, find help and let others know you are safe even if the power is out	A series of specific apps, tailored for specific disasters and crises.	To inform people and to mobilize volunteers
SOS4US	When someone requires instant assistance from family, friends, neighbors or colleagues. (medical attention, fire, burglary or the threat of violence)	Create personal networks of trusted people who can be alerted in case of emergency with single one push of the button. The networks created are linked to specific locations like neighbors at home, colleagues at work, fellow shop owners in mall or street	General public
Next door platform	Online closed social network, based on physical proximity such as neighborhoods. One of the largest in the US for non-crisis situations.	To support basic community functions such as: <ul style="list-style-type: none"> • Quickly get the word out about a break-in • Organize a Neighborhood Watch Group • Track down a trustworthy babysitter • Find out who does the best paint job in town • Ask for help keeping an eye out for a lost dog • Find a new home for an outgrown bike 	General public
I am Safe - NLRC	Website that enables people to inform friends and family they are safe after a disaster		General public

4 State of the art – Responding Community

Next we examine the responding community, volunteers that respond to the needs of the affected community by a disaster. The responding community can be members of the affected population as well, or can be outsiders. The responding community consists of both structured groups, ranging from volunteers trained specifically in responding to incidents such as civil defense organizations or the Red Cross volunteers, to groups who can provide aid but do not list that as their core task such as scouting groups or neighborhood community programs. Finally the responding community can consist of so called unbound volunteers. Individuals or groups who are only formed in response to the disasters: for which we have seen a rise due to social media and an increasing connected world.

4.1 Organization

In most European countries volunteers at emergency response organizations and civil society organizations form a crucial role in crisis response and recovery. Typically, the fire brigade is composed of volunteers for the most part. Also the medical services are supported by volunteer organizations such as the Red Cross and other first aid organizations. Besides medical support the Red Cross may also have the task to provide shelter and provide in basic needs, and in some cases to restore family links. In some countries, such as the UK and The Netherlands, also the police receive support from volunteers. In Germany the “Technisches Hilfwerk (THW), a national organization under the responsibility of the Ministry of Internal Affairs supporting firemen and ambulance personnel, consists nearly completely of volunteers. Germany and the Netherlands, and probably several other countries have volunteer “reddingsbrigades” (water rescue teams). These volunteers operate under the operational lead of the professional organization that they support or have associated with. All these volunteers are well trained (often an extensive training is compulsory), well organized, and it is not uncommon for them to receive a financial compensation for their work. In Deliverable 1.1 of COBACORE we have called this type of volunteers the Trained Volunteer Responders. In addition to the above mentioned volunteers at emergency services, many civil society organizations play a vital role in response and recovery. Psychosocial support is provided by organizations like “Slachtofferhulp”. Sweden counts 19 independent not-for-profit organizations that, in collaboration with the government, recruit and train volunteers to assist in disaster response. In the UK, each region counts many smaller volunteer organizations, which may or may not cooperate with larger (inter)national organizations like Salvation Army and Samaritans. The Civil Contingencies Act in the UK acknowledges the role of these volunteer organizations. The same Civil Contingencies Act defines a responsibility for companies in the UK crisis response. Utility companies and transport organizations are required to meet with local emergency services and make joint plans for the preparation and response phase of a crisis. Companies also have the obligation to provide any data relevant for crisis response. (Wijkhuis, Duin, 2012, Crisisbeheersing in Europa)

Without doubt, the foundation of crisis response and recovery is the resilient community itself. In the early stages of the response empirical research has clearly shown that local communities save the most lives (Gilbert, 1998). In fact, “no more than 10% of survival in emergencies can be attributed to external sources of relief aid”. (Bankoff, Frerks and Hilhorst, 2004).

Most West European countries point out their citizens on their responsibilities in staying safe for themselves and others. In Sweden, France and Germany, certain responsibilities of citizens are even defined by law. Surprisingly, Belgium hardly calls upon its citizens during times of crisis. Spontaneous help, as it often is uncoordinated, is experienced by professionals rather more a hinder than a help (Wijkhuis, Duin, 2012, Crisisbeheersing in Europa). See also Chapter 3 State of the Art – Affected community.

4.2 Processes and procedures

The responding communities, when considering processes and producers, can be divided in three categories. First there is the group of responding volunteers and community members who have either received specific training or at least are connected to or part of, the responding professional organizations. Examples include Red Cross volunteers, THW or civil defense groups. Second there are groups within the responding community that already have a structure and (internal) procedures in place. However these groups are not trained in the disaster response activities and –more importantly- are not yet (formally) connected to the responding professional organizations. Finally there are groups of responding community members who are not yet structured or organized but form during the disaster response and recovery operations. We refer to this group as ‘unbound’ volunteers. For each of these groups we identify the relevant processes and procedures for the COBACORE concept and platform.

4.2.1 Trained volunteer responders

The trained volunteer responders are connected to the professional organization involved in the disaster response. The processes and methods employed by these responding community members align and complement the processes and methods in use by their respective professional organizations. Because the volunteers are identified, known and trained in advance this connectivity can be ensured. While connecting to these groups is relatively ‘easy’, organizations must be aware of the requirements involved when scaling these groups. It will require a larger command and control structure when an increasing number of trained volunteers are involved. Furthermore the role and subsequently the processes for these volunteers will change when more of the other groups, mentioned below, are engaging. This will require trained volunteers to take on a more coordinating role and directing, training and collaborating with the other responding communities. Since these groups are more volatile in their formation and offered aid, processes and methods should allow for more flexible ‘plug-and-play’ to connect professional organizations and members of the responding community.

4.2.2 Community groups

There are several groups within the communities that could respond to the needs of the affected community. Such groups are not part of a formal response organization (or only informally for example through personal connections). Examples of such groups are scouting groups who can provide shelters, or soup kitchens who can provide food. The advantage of these groups is: they do have internal procedures and structures and are pre-formed. Such groups can be identified in advance and potentially connected to the formal response structures. However in most cases, these groups will not be immediately present during a disaster response and enlisting their help will require a more ‘flexible’ approach. While identification of these groups is easy, their offered help and coordinating within will have to be determined in the response operations. Thus requiring organizations to ensure that they not only know what groups exist, but also the aid they (can) provide, where they are active and how to provide them with the information needed for to optimize the impact of their activities.

4.2.3 Unbound volunteers

The key characteristics of the third group are that they do not exist before the disaster response operations. More specifically there is no (formal) organizational structure in place. This makes the group hard to identify, for two reasons: they have to be identified during the disaster response and they can be formed outside formal registers. Most commonly are groups of volunteers formed online (for example via social media). Another complications is that these groups do not have existing internal procedures or processes but design these during their work. This provides both a challenge and opportunity for other responding entities. By providing them with procedures, best practices and guidance, their efforts can create a larger impact and reduce the ‘risk’ involved with unbound volunteers in disaster affected areas.

4.3 Technology, tools and initiatives

Based on the authors own experience, interviews and literature review, our impression is that volunteer organizations in disaster response make limited use of ICTs and specific information systems in their internal organization and communications, and in their interaction to other organizations and citizens. This is probably related to the communication preferences of the volunteers themselves and the ICT skills of those running the organizations. Many volunteer organizations relying on “traditional volunteers”, see their volunteers aging. With a traditional volunteer we mean a volunteer who is formally registered and often a committed and long-time member, faithful in joining regular training and face to face meetings.

4.3.1 Case study German Red Cross

Within this project interviews were conducted within the German Red Cross in January 2014. The choice of interview partners reflects the aim to integrate different angles and needs in crisis management. All interview partners work (or used to work) in the GRC. Three of them currently work in the GRC head-quarters, one is working in the GRC Saxony state chapter and one respondent is retired. All of them were in service during the flood disaster 2013.

All interview partners are – more or less – inexperienced in the use of information management tools. It is striking that all of them are generally open to the usage of this kind of tools and stated that it would be helpful in fulfilling their tasks during crisis response. The interviews revealed that there are no common, standardized information management tools in use within the German Red Cross. Some GRC state chapters randomly use them; but as there is no standardization the effectiveness is doubtful. One reason for this seems to be high implementation costs. Furthermore all respondents share the channels used to receive information on crises. In order to receive information on crises (the interviewees are not involved in), they use radio, TV and internet as main channels. They additionally receive information via work from the command and situation center and the German Joint Information and Situation Centre (GMLZ) on crisis they are job-related involved in.

During crisis response the roles of most respondents are not clearly defined; in the course of the last years they mainly gained experience in the command and situation center. In this context the respondents fulfilled tasks in the field of human resources/internal services, situation assessment, operation and supply. Additionally some gained experience in public relations and served as information provider. No matter which task they fulfilled, all respondents assed their own and their teams’ performance during the flood 2013 as successful. Despite the fact that all respondents conceded that some aspects of crisis management could be improved.

An important indicator for this positive assessment is experience – especially from former floods, which helped all respondents to optimize their performance. It is striking that all interviewees independently emphasized the importance of experience, networks and the knowledge of existing structures during crisis response.

Nearly all of them stated that some information could have been provided quicker. Most time consuming overall was the coordination and communication with different actors. The lack of standardized structures were sensed as obstructive. Shared by all interviewees is a very positive and open attitude towards the usage of information management tools. Even though they are relatively inexperienced, they think the usage would be helpful especially in first response phase. In one respondents view the use of an information management tool would be especially helpful during recovery phase. By using such a tool, work could be coordinated more efficiently and shaped more structured.

4.3.2 Spontaneous volunteers

In contrary to traditional volunteers, one could define a relative new type of volunteers, the “spontaneous” volunteer. The spontaneous volunteer is not a member of an organization, but commits himself spontaneous depending on the type of disaster and his own circumstances at the time. He or she reacts to the needs of his direct environment or to another urgent / strong appeal, and joins other like-minded people in their action. (Almost) always his actions are ad-hoc and altruistic. The spontaneous volunteers form a valuable asset which presence can make a huge difference. However, for professionals and volunteer organizations it is also a very unpredictable asset, since it cannot be mapped at forehand and is very difficult to steer during response time. Generally speaking, young people are well represented in this group of volunteers. Young people make use of social media and ICTs in their daily life, school and work, and thus use ICTs and social media as primary channel to communicate and organize themselves during times of disaster. Good examples are the spontaneous volunteers at the German Floods in 2013, who organized themselves through various groups on Facebook (Matthias Max, German Red Cross, 2013), and the stranded train passengers after a black out at Utrecht Central Station, who were spontaneously offered accommodation for the night through Twitter. The American Red Cross, who is seen as a front-runner in the use of social media, uses mobile apps to recruit and mobilize volunteers.

A third type of volunteers are the Volunteer Technical Communities (VTC). These experts — who are most often technical professionals with deep expertise in geographic information systems, database management, social media and/or online campaigns — apply their skills to support disasters with collecting, analyzing and mapping all sorts of digital information. Because of the digital nature, VTCs can work from a distance, and often supporting members’ works decentralized from their own computers at home. Often VTCs make use of crowdsourcing methods collect information or mobilize (human) resources. Well known examples are the Ushahidi crisis maps used during the 2010 Haiti earthquakes and 2011 Japan earthquake and tsunami (World Disaster Report, IFRC, 2013).

Responding community platforms have some overlap with the toolset currently available to an affected community when it comes to individual crisis-skills preparation, but differences also exist. Specifically, recent years have seen a growth in online crisis platforms for harvesting social media data sources. This can be done via trained volunteer responders, or people that are helping to analyze data digitally via the internet (such as the StandBy Task Force)

name	why	what	who
Burgernet	To mobilize citizens as eyes and ears for the police in urgent cases where a clear description is available, for example: theft or burglary, failure to stop after an accident, robbery, missing persons	Voice or text message with the request. Participants with information can call directly to the emergency room	Participants who subscribed to Burgernet. Those located near the place of interest, receive instructions from the police to look for a person or vehicle.
FEMA apps	General ways for people to get involved before and after a disaster	Preparedness information for different types of disasters, an interactive checklist for emergency kits, a section to plan emergency meeting locations, information on how to stay safe and recover after a disaster, a map with FEMA Disaster Recovery Center locations (one-stop centers where disaster survivors can access key relief services) and Shelters	general public
Red Cross apps	Prepare for and mitigate effects from disasters and individual crises (tornado, first aid, earthquake, flooding, pet first aid etc.) i.e. Get notified when an earthquake occurs, prepare family and home, find help and let others know you are safe even if the power is out	A series of specific apps, tailored for specific disasters and crises.	Inform people and to mobilize volunteers
SOS4US	When someone requires instant assistance from family, friends, neighbors or colleagues. (medical attention, fire, burglary or the threat of violence)	Create personal networks of trusted people who can be alerted in case of emergency with single one push of the button. The networks created are linked to specific locations like neighbors at home, colleagues at work, fellow shop owners in mall or street	General public
Ushahidi	Volunteer team behind Ushahidi rapidly developed a tool for Kenyans to report and map incidents of violence that they saw via SMS, email or the web. Within a week Ushahidi had gone from idea to live deployment.	Open source platform: verified and unverified information can be visualized. Open modification of the system allows for multiple types of visualizations of this data.	Who: the open source platform has been used by different crowds to monitor elections in India, Mexico, Lebanon and Afghanistan. It has been deployed in the DR Congo to track unrest, Zambia to monitor medicine stock outs and the Philippines to track the mobile phone companies.
Sahana Eden	Flexible humanitarian platform for humanitarian needs management either prior to or during a crisis.	Sahana Eden's features are designed to help Disaster and Emergency Management practitioners	Integrate raw social media feeds, but lack capabilities for distilling useful reports, and reducing information overload when activity is exceptionally high.
Next door platform	Online closed social network, based on physical proximity such as neighborhoods. One of the largest in the US for non-crisis situations.	To support basic community functions such as: <ul style="list-style-type: none"> • Spread the word out about a break-in • Organize a Neighborhood Watch • Track down a trustworthy babysitter • Find out who does the best paint job in town • Ask help in searching for a lost dog • Find a new home for an outgrown bike 	General public.

5 State of the art – Professionals

Finally we examine the state of the art for the professionals. Also the professional organizations, procedures and tools used can differ greatly between countries and types of incidents to which they respond. However there are common elements, when considering the opportunities and issues that the COBACORE project aims to address. More generally there are specific considerations for aligning the platform and project with the existing structures.

5.1 Organization

The organization of the national security sector differs significantly per country. Obviously, in all European countries the government is end-responsible for national security and plays a primary role in providing security, but the relation that government and civil society have on this subject differs. For example, in one country security is almost fully in the hands of the government and citizens expect and trust their government in providing safety and security. In other countries, the trust in the authorities may be lower, and communities or organizations hire private companies to provide security and/or initiate own communal projects. Also NGOs, CSOs and religious organizations do play an important role, sometimes on a broad and national level (e.g. Red Cross), sometimes on a local level or for specific groups (e.g. churches) or specific safety aspects (e.g. psycho-social care). Trained volunteers serve as a bridge between the professionals and the responding community. They are community members that are trained to act as a professional; which means that they are responsible, skilled but also acting on grassroots-level. See also Chapter 4 Responding Community.

Within the government or public authorities, security, and more specifically, crisis management, is organized in different ways in European countries. At municipality level the mayor is often end-responsible for responding to local emergency situations, and in charge of local emergency services such as policy, firemen and health/medical services and of course of his own municipality. Typically the mayor will be supported by an advisory body consisting of representatives from the local emergency services and civil servants. At operational level the fire brigade often has the operational lead in the response, but the lead may also be with the police (UK) or with a multi-disciplinary team on the disaster site or on distance (NL). Operational tasks per organization also differ somewhat per country, but important for COBACORE is to note that the municipality, in its responsibility to take care of its citizens, typically has the task to provide information to its citizens, to provide shelter and basis needs directly after a disaster, to register casualties and damage, and to provide aftercare. Depending on the scale and the administrative division of the country, most countries have some sort of coordination at regional level (province, state or non-constitutional regional entity) that comes in action as soon as the crisis affects neighboring municipalities or is likely to expand to larger areas. Some countries though, such as the UK, directly scale up to national level, while Germany scales up in 5 different levels, with different laws and regulations per state (Länder). (Wijkhuis, Duin, 2012, Crisisbeheersing in Europa). Whether or not any regional levels carry administrative responsibility or only have an coordination and supporting task differs per country. In some countries, like Belgium, the Defense organization has an operational role at regional level. In the Netherlands, a recent development resulting from intensified policy on civil-military cooperation, is that a liaison officer from the defense organization joins the coordination at regional level (Veiligheidsregio).

At national level crisis management often is an interdepartmental issue, that may be coordinated by one department such as the Ministry of Safety or Security, or by the department being responsible for the predominant domain of the crisis. Also other administrative bodies may be involved. E.g. in the Netherlands, a country with a long history with water, the “Waterschappen” play a vital role in water management and in (the prevention of) floods. Finally, specific knowledge institutes, consultancy firms and a priori identified experts do play a role by supporting officials with expert advice.

It is important to note, that whereas for the crisis relief phase often special organizational structures are defined with tasks as search & rescue, providing basic emergency services, recovery from a crisis is typically in the hands of the regular administrative bodies such as the affected municipality. We found that, generally speaking, the relief phase gets much more attention in terms of preparation, procedures, resources, (volunteer) support, than the, perhaps less sexy, recovery phase.

5.1.1 Case Study Safety regions Netherlands (Veiligheidsregio’s)

As part of the research undertaken in this project, expert interviews haven been taken with staff at three different Safety Regions (Veiligheidsregio’s) in the Netherlands. The Safety Regions in the Netherlands take over coordination and responsibility as soon as a disaster extends beyond a single municipality. Interviewed staff members were all information managers, but work at different coordination levels such as: on site at the disaster and at region coordination office. In the interview, they were asked questions on the interactions they have with other responding professionals, with affected community members and with the responding community members. Subsequently, they were asked what state of the art communication tools and information systems they use, besides traditional media such as radio and TV, and what their experience was with these tools and systems. Finally, we introduced the COBACORE concept to them and asked them for feedback.

For crisis communication and coordination in between professionals working in the emergency sector, the Netherlands has deployed a national crisis management system (LCMS). All interviewees mentioned that they work with LCMS. LCMS has the ability to interface with or import external data, but this is not yet used till its full potential. For example, social media data is not imported yet on a structural basis.

On the communication with affected community members, all referred to experiments with social media, but acknowledged that social media are not yet part of operational policies nor systems. Social media are only used on ad-hoc basis, depending on the accidental interest and skills of staff, and the use is not integrated in wider systems or operational procedures. Experimental usage of social media reported was: by professionals to inform, warn and possibly instruct communities via twitter, for professionals to obtain improved situational awareness via updates and pictures on social media. A challenge mentioned with the latter usage was that the quality of social media analyses varies heavily (different from crisis to crisis) and therefore not all the decision makers are using the additional information to its full extent. Another challenge in analysis of social media data from a distance is to obtain a feeling for the severity of the disaster. Especially if other social and traditional media copy and re-broadcast updates and messages, the problem may easily be overestimated while professionals feel extra public pressure to act. Besides the use of ICTs also the importance of face to face contact was mentioned, both in prevention phase as well as during and after a disaster. E.g. in prevention phase safety regions meet community members at risk to explain what safety regions can do, and what community members can do themselves.

At smaller disasters (e.g. minor floods) community members know how to help themselves, and know whom to call at the safety region in case the disaster worsens. Also the spontaneous help of other community members and their self-organizing capacity in solving problems was mentioned.

On the interaction with the affected and responding community, several ICT tools were mentioned, such as the SMS alarm broadcast system NL Alert, missing child broadcast system Amber Alert, and websites such as <http://rijnmondveilig.nl/> giving near real-time information on incidents. The safety regions also referred to the SIGMA teams (medical standby volunteers) of the Netherlands Red Cross. In general the interviewees saw the potential of social media and of a platform such as COBACORE to improve situational awareness and to improve interaction with community members.

5.2 Current Processes and procedures

Currently, professional communities have a wide variety of coordination tools available (see 4.3). Most of these systems are used for information sharing between services (police, fire brigade, ambulance) and de-confliction of activities during an operation. Nevertheless, no particular systems have been identified which are used on a structural basis by responding professionals, while at the same time incorporating insights from social media sources in a standardized manner. Furthermore, the NGO field also performs data gathering and analysis after a disaster, usually via household/village questionnaires. It could be possible that the COBACORE platform collects data by proxy as well (not on individual level, but on family, household, village level), based on the sometimes limited amount of information which is available in the first few weeks after a larger scale disaster.

Although the last few years have seen an increase in experimental settings in which professionally used information sharing systems aim to incorporate crowd sourced information from social media (e.g. in the Netherlands the mayor who is coordinating a crisis operation, has a social media/press communication officer who advises on information strategies based on the media perception) no integrated systems currently exist. More specifically, no examples have been found in the State of the Art in which crowd sourced information is filtered, analyzed and presented in a standardized manner which is aligned with the current ways of working of the responding professionals. Furthermore, an application in which crowd sourced media is used by professionals in a social media 2.0 setting (feeding tailored information back to the individual/group which has sent information via the web, instead of a single message for the affected and responding community *as a whole*) has neither been found in a professional responders setting. See chapter 5 for more information in this field.

5.3 Technology, tools and initiatives

For professionals, a wide variety of toolsets for coordination exists. Maybe even too many, resulting in 'yet another platform' which is not fully in line with the operational procedures of the professional organization. On EU level, different coordination platforms exist such as INSPIRE, GDACS and ERCC all serving a different role during a crisis. However, none of these systems has been extensively used over a longer period of time due to various reasons. Even within the Netherlands where quite some effort has been put over the last few years to work in a 'netcentric' community during a crisis which is supporting by the LCMS platform, different usage levels are found. Some regions do not want to use the LCMS system, thereby limiting effectiveness of the specific response.

name	why	what	who
INSPIRE	Data infrastructure to enable sharing of environmental spatial information among public sector organizations and better facilitate public access to spatial information across Europe	Geoportal searching & accessing geographic information	Provided by governmental, commercial and non-commercial organizations
GDACS	GDACS provides alerts and impact estimations after major disasters through a multi-hazard disaster impact assessment service managed by the European Commission Joint Research Centre	What: GIS data: flood extent, earthquake damage assessment, landslide extent	<p>–Satellite Mapping Coordination System: a tool for GIS-experts working with satellite imagery to have information on who does what and where in terms of satellite image analysis per event</p> <p>–Media information: mass and social media, specifically related to events</p> <p>–Some 14,000 disaster managers from governmental and non-governmental organizations have subscribed to the VirtualOSOCC</p>
WISER	WISER (Wireless Information System for Emergency Responders) is a mobile application designed to assist first responders in hazardous material incidents	Specific database for hazardous materials that can be encountered by first responders during a crisis	First responders in general, and HAZMAT units in particular
Twitcident	Twitter filtering and analysis system that improves situation awareness during small-scale crisis response, such as music festivals and factory fires	It gathers geotagged tweets only and employs classification algorithms to extract messages about very specific events	For local authorities, police, emergency services and operators
Tweet Tracker	To gain situational awareness immediately after a disaster or crisis	The tool is capable of monitoring and analyzing location and keyword specific Tweets with near real-time trending, data reduction, historical review, and integrated data mining tools	primarily first responders
Twitris	Decision making analytics platform for multi-faceted analyses of social data: spatio-temporal-thematic, people-content-network, sentiment-emotion-subjectivity etc	A Semantic Social Web application with real-time monitoring and multi-faceted analysis of social signals to provide insights and a framework for situational awareness, in-depth event analysis and coordination, emergency response aid, reputation management etc. web resources (news, Wikipedia pages, multimedia), SMS data, followed by applying background knowledge to perform multi-faced analyses	Answering questions of interests to corporate analysts and event coordinators
Influenza Monitor app	create overview of influenza hotspots	report and monitor influenza infections	general public and medical responders
LCMS	The NLD National Crisis Management System is developed to ensure centrally coordinated deployment of police, fire and medical assistance	Services and players can exchange messages, see who's online and off, and monitor actions. Focus on functions, not on hierarchy	in use in 20 out of 25 security regions (professional responders) in NLD

6 State of the art in other sectors

Some of the introduced organizational structures, procedures and tools (technologies) mentioned in the previous chapters can also be identified in other fields besides disaster response and management. Considering the various interactions that can occur between the groups of the COBACORE concept (affected community, the responding community and the professional organizations) we can also see similar interactions for example in the commercial service industry. While the circumstances are different, several other fields also deal with the needs of the community (customers) and engage with them to provide them what they need in an efficient and effective manner.

Of course some freedom has to be taken to definitions of the various groups as defined within the COBACORE project, but considering the aspects of these groups referred to in this state of the art analysis, there are certain similarities. First the professional organizations, who have an official mandate and responsibility to support the affected community. In a same way commercial organizations have a key objective to support their customers and address their needs. Furthermore in both fields, these organizations are dedicated to addressing the needs, i.e. they have the resources needed, the organizational structures and procedures in place specifically for their strategic objective or mandate.

In recent years, similar to the field of disaster response and recovery, several new opportunities have presented themselves to these organizations to reach out and connect to their customers and engage with potential new users of their products and services. Most notably the introduction of web 2.0 and specifically social media has enabled new forms of interactions with these organizations. In the commercial service industry, such as aviation, these new forms have not only enabled organizations to gauge the sentiments of the clients about their products, but also pro-actively engage these customers to change that sentiment. Finally these opportunities have provided new ways for organizations to extend their service delivery closer to their clients.

In this section we present two organizations that (1) have employed these new opportunities to engage with their customers, (2) use these opportunities to extend their service delivery and (3) use them to improve their internal business processes and organizational efficiency and effectiveness. These organizations deal with a large volume of (initially) 'unidentified' customers with the same characteristics as the affected community, namely various needs that need to be addressed using certain business processes at a high level as well as various individual interactions. The two organizations studied in more detail are: the Nederlandse Spoorwegen (NS, Dutch railways) and the Koninklijke Luchtvaartmaatschappij (KLM).

6.1 Nederlandse Spoorwegen (NS)

The NS is responsible for the large majority of transporting passengers across the Dutch railways. While the maintenance of the railways infrastructure is the responsibility of the semi-government organization ProRail (supervised by the Ministry of Transport and Infrastructure), the NS is responsible for the passenger transport and forms the main point of contact for these passengers, even when dealing with effects (such as delays by infrastructure repairs) caused by ProRail. NS runs about 4800 domestic trains a day, serving about 1.1 million passengers.

6.1.1 Webcare

In addition to the overall monitoring of social media and the sentiment of the users about the NS, the NS has a dedicated Webcare team. This Webcare team is responsible for addressing the request of the users. While the options –due to the complex organization of the train operations- to respond to individual requests are limited, the Webcare team does cater to individual requests for information.

By combining the internal knowledge about schedules, disruptions and alternate routes the Webcare team can provide detailed information to the passengers. Furthermore the Webcare team is also able to enlist and offer certain services, such as assistance for disabled passengers or taking care of administrative processes. The NS has equipped and trained their Webcare team to be able to map these requests to the various procedures and processes that exist in the organization. The Webcare team is able to identify these needs and use the appropriate channels to address them either directly or provide additional guidance (information) to the customer in need to get his or her needs addressed.

6.1.2 Disruption handling

The NS also employs these options to engage with a larger audience during the disruptions. In these situations there are several ways to aid the NS in resolving this matters quickly and – perhaps more importantly- satisfy the customer. First the NS employs social media to detect the sentiments of their travelers, for example using platforms such as Twitcident. Such analytical programs are able to detect certain trends and can be used to identify or even predict certain disruptions that are perhaps not reported via official channels. Next the Webcare team, or more specifically the general communications department of NS can send out general information about certain disruptions as well as general advice for example for detours. The Webcare team however will continue to respond to individual requests, which will increase significantly when large disruptions happen. Finally passengers of the NS are also able to provide feedback and real-time on-site reporting on the disruptions and incidents, serving as a large sensor network.

6.1.3 Impact

The most important aspect of the use of these opportunities by the NS is the integration and link between their organizational procedures and the ‘world’ of their customers. The Webcare team is well aware and tied into the organization, and should be in order to effectively address the (information) needs of the customers. This organizational integration is an important prerequisite to tap into the full potential web 2.0 and social media technologies. As these are the facilitating medium to connect to customers, it is important to design and integrate the supply ‘content’ that is communicated via this medium.

Another important element to consider is the scalability of the Webcare team. While operations are running according to the plan or schedule, the load on the Webcare team is much lower. However when disruptions occur the requests for information and specific needs of travelers increase dramatically, which means that the Webcare team should be able to scale up as well. There are several ways to facilitate this, for example through standby shifts, the option to work remotely and to work closely with the general information provisioning to combine and address multiple questions at once.

6.2 KLM

The Royal Dutch Airlines (KLM) operates from its main hub in Amsterdam, the Netherlands. KLM operates flights for passengers and cargo to over 135 destinations worldwide, employing over 32.000 employees worldwide, utilizing a fleet of 118 aircrafts. KLM in its branding and strategy focusses strongly on building relationships with its customers. The services of KLM go beyond mere transport from A-to-B, but also include services prior to departure and after arrival. KLM aims to provide a full door-to-door travel experience for its customers. Interactions with their customers play a crucial role in this strategy.

6.2.1 Social Media Strategy

KLM has an extensive presence on various social media platforms, like Twitter, Facebook, Pinterest, Instagram, LinkedIn, Google+, and YouTube. KLM additionally runs a blog. Customers can ask KLM questions through these channels. Also, these channels are used by KLM to keep their followers up-to-date on the latest KLM news, marketing campaigns, and promotions.

The usage of social media platforms to reach customers experienced an extreme uptake when the Icelandic volcano Eyjafjallajökull erupted in April 2010, which caused extreme disruptions to air traffic. Customers used the social channels to reach KLM. In turn KLM decided to utilize these social networks to reach out to customers and provide them with information about the situation. Following the increased use of social media, KLM decided to create a centralized social media site for the public in October 2010, establishing the Social Media Hub. KLM is a worldwide leading example for the use and integration of social media in their CRM and operations.

Similar to the NS the social media hub engages and interacts with (potential) customers of KLM to enhance their experience. However, because of the wide array of options and services available to customers the social media hub and its team are even more tied into the organizational processes. They have access to the core system of the KLM operations, not only enabling them to get for and provide information to customers but also to change options on behalf of them. For example changing seat-assignments, rebooking on flights or provide compensation when the flights are delayed. They are also able to connect with the ground- and aircrews providing them with requests received from the customers. In short, the Social media hub provides customers with a personal and direct interface to all the services offered by KLM.

6.2.2 Social interactions and integration

In addition to the use of social media specifically and interaction between the professional organization (KLM) and the targeted community (the (potential) passengers), KLM also enables other members of the communities to connect to each other. KLM facilitates the interaction in and between the various groups. This in turn facilitates KLM in reaching its strategic objectives:

- **Meet & Seat:** this service lets passengers find out about interesting people who will be on board the same KLM flight by connecting their Facebook or LinkedIn profile to the flight. Meet & Seat facilitates contact with fellow travelers who have the same background or interests. By launching Meet & Seat, KLM became the world's first airline to integrate social networking in its regular flight process.
- **Trip Planner:** this platform utilizes Facebook in order to organize a trip with Facebook friends.
- **Twitterbots:** KLM operates several Twitterbots, these include a bot to request the current status of a flight and a bot to request the lowest KLM fares to a destination on a specified date or in a specified month.

6.2.3 Benefits

The social media strategy of KLM shows how to connect their own services to the customers, using their connections to extend their service and implement their strategy. An important lesson learned from KLM social media strategy is the 'empowerment' of the social media hub. Not only to find and provide information of customers, but also the ability to act in their behalf. The social media hub consists of employees from different departments and business units of KLM, jointly providing a wide range of knowledge and access to provide services to customers. Finally KLM uses social media to provide new services for customers to engage with each other. These connections are formed outside the responsibility of the KLM, but are merely facilitated by them. Of course KLM is able to track these connections and can potentially offer additional services for such interactions.

7 Results: trends, gaps and opportunities

Based on the analysis introduced in the previous sections we can distill several important results for the further development of the COBACORE platform. In general via the analysis of the various groups and their interactions we find several trends, gaps and opportunities in the domain of community based disaster response and recovery. The analysis shows which gaps COBACORE needs to fill, which can be translated to must have requirements as well as opportunities to create a unique and added value and finally elements that are to be considered for the dissemination strategy by ensuring adoption of the platform during and after development. Following the structure of the previous sections, we examine these results for the interactions and organizational structures, the methods and procedures in place and the tools, technologies employed and available for comprehensive, community driven approach for disaster response.

7.1 Interactions & organizational structures

From the analysis it shows that many professional organizations adhere strongly to an organizational structure in their disaster response operations. These procedures and processes are often inspired from the 'command and control (C2)' approach, derived from the organizational structure employed by armed forces. While this organizational structure provides an –apparently- optimal control of the situation it requires a single person or entity in the organization to have an absolute overview of the situation to make decisions. The centralization of the decisions, responsibility and thus the information flow, makes the disaster response organizations quite strict while at the same time putting quite high pressures on the accountable persons. Finally such structures also provide less flexibility to act on specific opportunities that arise in the response, such as spontaneous volunteers and take away autonomy from communities to articulate and direct the disaster response to their vision.

This fundamental change in the overall organization of the disaster response, envisioned in the COBACORE concept, requires a careful consideration in regards to the alignment of the existing structures of professional organizations. When COBACORE is implemented it becomes a mediating platform between the various affected communities, responding volunteer communities and professional's responding organizations. This changes the role of the professional organization significantly, for example from a command-and-control organization to a broker or mediating organization that connects the needs of the affected community with the offered support from various volunteer and professional organizations. In other words, there will no longer be an overall hierarchical structure, but rather a network of communities of which the interactions are monitored and facilitated by the responsible government agencies, support by the COBACORE platform. A more specific example are the teams operating COBACORE and facilitating these interactions. Analog to the Webcare teams of professional service organizations these teams well actively engage with the various users in the platform to mediate. One of the key questions becomes the accountability of the users acting on the platform and the mandate of these teams.

On the roadmap towards a situation where the disaster response and recovery operations are facilitated through a mediating platform and a network of organizations and communities, we envision a hybrid form. In this form formal command-and-control structures remain in place, mainly addressing the immediate needs, e.g. medical aid or rescue operations. In addition for less immediate needs, the platform could be deployed, leveraging the resources of various communities to address the needs of the affected population more effective and efficiently.

(Webcare) teams of trained volunteers would manage this platform and actively search out and engage the online responses. Akin to the Webcare teams, such team would need a place in the existing organizational structure in order to have various options to undertake action.

7.2 Current methods, procedures and processes

The state of the art analysis shows various opportunities to enhance existing procedures and processes. As illustrated in the previous section, to act on these opportunities a paradigm shift in the organizational structures is needed. By placing the (network of) communities central in the disaster recovery process, also the existing processes need to be adopted by the platform, and vice versa the processes need to be adapted to fit the platform. While it is important to ensure that the platform fits existing processes as well as possible, to ensure a high adoption level, it is inevitable to adopt certain processes to leverage the potential of engaging directly with communities. Specific examples include the dispatching of responders and allocation of resources. Through the COBACORE platform a more frequent and accurate update of the needs can be obtained, thus requiring organizations to improve the agility of logistical operations.

It is also important to design the interface considering existing systems. While the COBACORE platform can support multiple methods of access for each of the user groups, for example via a website, or a mobile application, it is important to consider that many users will already have a preferred method for interaction. The affected community will use various methods, for example depending on the infrastructure available, the familiarity with technology or urgency of the request. For example certain needs might be reported to emergency call centers (112 or 911), other might be reported via general communication channels (phone, emails etc.). A small, but growing, portion of the needs and information in a disaster will be reported via social media. It is therefore important not only to provide own, direct interfaces to the platform but allow various communities to interact with the platform via channels that they already use. For example via Facebook (e.g. for the responding community) or integrated in the call centers applications (e.g. for the professional organizations). Finally, we should consider users acting as proxy for those not able to interact with the systems (regardless of the interface) themselves.

7.3 Tools, technology and initiatives

Different types of platforms already exist that help to facilitate collaboration. As the overview below shows, a substantial amount of currently available tools focus on individual skills and improvement thereof during or after a crisis, as well as collection of general crisis information from various groups within a society via Twitter, Facebook or existing social media channels. More recently, the trend of collecting information 'from the ground' from specific groups (e.g. specific neighborhoods, doctors, affected groups) has grown substantially.

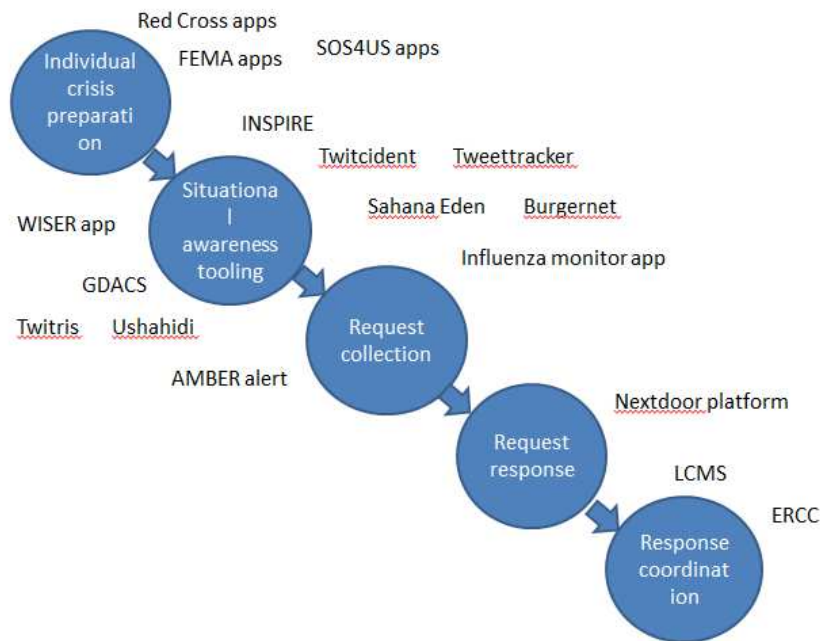


Figure 2: Technological trends and existing platforms

Several trends can be identified from the state of the art analysis of current platforms for collaboration:

- Trend from large-scale government led crisis systems towards crowdsourcing applications for a variety of purposes
- Trend from using people as simple sensor (find bad guy, call police) to more complex tasks (first aid, send pics, analyze local situation, interpret crisis intel)
- Trend from top down to bottom up: not only government to citizen, also citizen to citizen and citizen to government
- Trend from using platforms to harvest crisis data to improve situational awareness to giving specific instructions back to very specific groups (or even individuals) of citizens (and not only professional colleagues)
- Growing number of more advanced apps enable trend towards tailored information exchange on individual level: not only tweets but concrete aid requests for specific situations for specific (groups of) people
- Crisis apps remain too crisis oriented: no apps incorporate reconstruction activities

Furthermore, some specific applications/platforms have been found that focus on coordination among professionals (LCMS, ERCC) and one example has been found to community groups to ‘coordinate’ non-crisis activities called the Nextdoor platform. A crisis version of Nextdoor has not been found; nor has a platform been found which connects both the responding professionals and the affected and responding community. COBACORE aims to fill this gap.

More specifically, various concrete instructions can be given for the improvement of the COBACORE platform itself:

- Tailor the platform/app for different user groups: even within the professional responders, affected and supporting communities there are multiple subgroups with different information needs
- Use multiple information sources: apps have low saturation level among the public but high quality, Twitter has wider coverage but lower quality (10% geotagged, 2% usable)
- Stimulate people to download and use app prior to a crisis (by adding pre-crisis features: high water levels, Burgernet information)
- Interactions with various groups are not in a single direction, it becomes an increasingly collaborative effort. Not only 'harvesting' information from the general crowd, but engage with specific groups and individuals, for example through a Webcare interface.
- Analysis shows that platforms/apps are only used when
 - The public is informed on what their handling perspectives are prior to and during crises
 - High usability/low complexity
 - Reliability: no crashes
 - Privacy: ensure transparency on how collected information is used

8 Conclusion

In the previous sections we have examined the state of the art, based on the various groups that are identified in the COBACORE concept, introduced in Deliverable 1.1. We have examined the state of the art for each of the groups in terms of the organizational structures, the processes and methods they employ to achieve their objectives and/or mandates, and the supporting tools and technologies to support these processes. In this state of the art analysis we have been able to identify which aspects of the COBACORE concept are currently presented within the organizations and the interactions between them, which are absent and thus need to be considered in the further development of the project. In addition we have examined some practices to engage with communities used by the commercial service industry on how to bridge these gaps.

While the research, results and findings presented in this document are still abstract and high-level descriptions, they provide points that should be considered within the COBACORE concept in general, and the development and use of the platform in particular. These areas of interest need to be further examined for implementation in the various work packages. There are 3 areas that need to be considered in the further development of the COBACORE platform, as well as in the dissemination strategy. These areas are: (1) the flexibility and integration, (2) organizational embedment and adoption, and finally (3) user identification and interaction.

8.1 Flexibility, interface and organizational embedment

An important element illustrated in the various case studies is the wide variety of scenarios that can occur in disaster response and recovery operations. There are significant differences between countries, organizations and response structures. In turn these also differ greatly depending on the type of incident or disaster to which these organizations are responding. This requires are large flexibility from the organizations to deal with all these possible scenarios.

It should be noted that because of the various groups involved in the COBACORE platform each functions in their own way. This implies that the COBACORE platform should provide a high degree of flexibility and configurability to ensure a proper alignment with the processes of all involved groups. For example the platform should align with the methods and procedures used by professional organizations, but at the same time should facilitate the unstructured groups of unbound volunteers in their need for information. While this is a major challenge, it is also an opportunity that many platforms have not successfully addressed. Many of the platforms introduced in this state of the art analysis focus on one or two specific (types of) groups. For example the Nextdoor platform, has a strong focus on connecting initiatives with community members but does not provide a tailored interface for governments. COBACORE could be a mediator or ‘adapter’ between the different interface and integration need of the groups.

In order to ensure that the interface works for each of these groups, a trade-off has to be made between tailored and generic interfaces. Most importantly is to provide an interface to the platform that connects the users in a manner they are accustomed to. This has implications for interfaces at the organizational level, for example by providing a community leader with the needed information, at the process and procedural level, for example by providing instructions and at the technology level, for example via the social media platforms already in place. At each of these three levels for each group, an interface has to be considered during the design, dissemination and implementation. The results from the state of the art analysis provide certain criteria that should be considered in order to provide these interfaces.

Closely related to this flexibility and interface considerations is the organizational embedment of the COBACORE platform in the organizations. The organizational embedment, in particular for the responding professionals is an important element in ensuring that COBACORE has the desired impact. It also relates closely to the dissemination strategy examined in Work package 6. A key element to consider in the further development of the COBACORE platform is to support or augment existing interactions. Aligning the platform with these interactions, rather than replacing interactions and processes that are already in place, ensure a higher level of adoption.

8.2 User identification and interaction

The state of the art analysis shows that there are various interactions of the COBACORE concept already embedded in the organizational mandates and routines. Mainly the interactions between the professional organizations have clearly established mandates, various procedures and the tools to facilitate them. Some of these professional organizations also extend their procedures and tools towards the responding community, but mainly to the trained volunteer responders. These volunteers are trained in the procedures and tools for collaboration in advance to an incident. More importantly, because these volunteers are registered with the professional organization, identifying, connecting and communicating with these volunteers is relatively easy.

This connection becomes increasingly more difficult when dealing with a group of responding communities that are less connected to the professional organizations. Existing community groups and structures, may be identified in advance but their specific role in the disaster response operations will be dynamic and undetermined in advance. A proper way of interacting with these groups needs to be designed and integrated in the platform. The implementation should allow the exchange of information relevant to the activities undertaken by the responding community. However, it is important to notice two aspects that will have to be considered. First the exchange of information between the professional responders and the responding community. This exchange ensures a common situational awareness and will for example let the professionals track the efforts provided by the community. Secondly the platform should also enable the responding community to engage with the professional community, for example to exchange knowledge, provide training and forge collaborations. In short the platform should enable or facilitate a dialog, rather than a hierarchical command and control approach towards directing the responding community.

When dealing with unbound volunteers this role will also be undetermined. But in addition these groups cannot be identified in advance and therefore need to be actively searched for, either online or through reporting from people working in the field. There are several approaches towards identifying these groups and individuals. First there could be an active campaign for volunteer organizations and citizen initiatives to 'come forward' and connect via the platform, however this is a rather passive approach and may only reach certain groups. Other initiatives need to be actively searched for, most notably on social media platforms and actively engaged or 'pulled in' the response organization (while considering their motivations and structures). Finally by providing added value, for example additional resources or recognition through the COBACORE platform, the responding groups can be incentivized to register on the platform.

Following the identification stage, the (groups of) unbound volunteers continue to be part of the responding communities as described in the previous section, with the key differences that these groups are more volatile in terms of their composition and vary greatly in their cohesiveness, resources, skills and knowledge throughout their activate involvement. That's why they will require more continues monitoring and interaction.

9 Appendix

9.1 References

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