EGOV-CeDEM-ePart

Crisis Volunteerism and Digital Transformation

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Abstract: When crisis volunteerism is enacted, citizens from all walks of life mobilise, and interaction is required between numerous individuals, organisations, authorities and stakeholders involved in the response work. This was evident in Sweden in 2018 when forest fires engulfed parts of the country. At the time, digitalisation and information systems were completely lacking. At the same time, it is noted that many IS solutions that could enable crisis response volunteerism never reach this practice area. Studies have been performed to explore how the crisis volunteerism context needs to be understood with a view to enabling digital transformation and relevant IS design initiatives. Based on these studies, this paper discusses crisis volunteerism and the crisis environment and introduces a preliminary meta-model for understanding these and other components central to the practice of crisis volunteerism.

Keywords: Crisis Volunteerism, Digital Transformation, IS Design

1. Introduction

Previous information systems (IS) research gives insight, both theoretically and practically, on the potential of IS and digital transformation (DT) in the public sector to enhance and support crisis volunteerism (CV). The lack of digitalisation and IS observed during the Swedish forest fires poses questions of why CV is not being transformed in a similar manner to other important practice areas in the public sector and what needs to be done to remedy this? Crisis managements scepticism to voluntary contributions, in particular more spontaneous or unaffiliated contributions may be one problem (Barsky et al., 2007). More recently CV is however viewed as a reality to be dealt with rather than as an optional add-in (Strandh and Eklund, 2018). Rogstadius et al. (2013) discuss the fact that many technical solutions enabling new or improved forms of volunteering are never integrated into response efforts and conclude that there is a mismatch between designs and real world needs. It would appear that several years on, the situation is much the same and there are few real life IS implementations and solutions for crisis volunteerism (ISCV).

The overall aim of the full research project is to facilitate an understanding of crisis volunteerism (CV) that can be used to enable public sector Digital Transformation (DT) in a manner that will significantly enhance the overall societal response in crises and disasters. In this paper, due to space limitations, only one of the main components of CV, the crisis environment, is developed to demonstrate the approach. The more specific research questions posed in this paper are therefore 1) what do we need to know about crisis volunteerism and its environment to facilitate digital

transformation and IS design for CV? 2) What are implications does this knowledge have for crisis management and crisis volunteerism practitioners in Sweden? Finally the question of how future ISCV research needs to be directed in view of these findings is addressed. In this paper the results of a literature study on CV and the crisis environment as well as DT and IS design are presented in sections 2 and 3. The research approach and description of the Swedish forest fires case is relayed in section 4. Results outlining the crisis environment context, based on the study of the Swedish forest fires case, is reported in section 5. These results are discussed and the research questions above are addressed in the final section with discussion and conclusions where a preliminary meta-model for crisis volunteerism is presented.

2. Understanding Crisis Volunteerism and The Crisis Environment

Bénaben et al. (2016) observed shortcomings in conceptualisation and understanding of crisis management in IS research and developed a meta-model for crisis management. They are inspired by business modelling and their model observes four packages of concepts required to describe crisis management with a view to informing IS design; Context, Partners, Objectives and Behaviour. This meta-modelling approach has inspired the organisation of the results from this research, and a review of ISCV literature has revealed seven main components that are required to understand CV. These are 1) the crisis event (e.g. Bénaben et al., 2016), 2) the crisis environment (e.g. Shen and Shaw, 2004), 3) strengths, weaknesses, opportunities and threats (SWOT) and objectives (e.g. Zettl et al., 2017), 5) processes (e.g. Sobiegalla et al., 2017), 6) stakeholders (e.g. Strandh and Eklund, 2018) and 7) volunteer work or tasks (e.g. Waldman et al., 2016).

Within the environment component, which is focused on in this paper, the main issue for ISCV research is collaborative structures and in particular collaborative interactions between stakeholders. Parallels are also drawn to developments within e-government and for example co-production of services (Pilemalm et al., 2016). Four main types of interaction have been observed in the literature study. 1) between authorities and formal CV organisations (e.g. Shen and Shaw, 2004), 2) between authorities (or formal CV) and non-formal CV actors (e.g. Zettl et al., 2017), 3) between citizens (non-formal CV) (e.g. Simsa et al., 2019) and 4) between authorities and non-formal CV (e.g. Middelhoff et al., 2017). Other aspects of the crisis environment addressed in the literature are the impact of legal and ethical issues, resources, the effect of culture and institutional arrangements and not least crisis preparedness. Also social, natural or physical characteristics of the crisis environment can have relevance to the crisis response. For example demographics, climate, timing or natural elements.

3. Digital Transformation and IS Design for Crisis Volunteerism

The terms digitalisation and digital transformation (DT) are defined in terms of a process with the power and potential to restructure and transform organisations, institutions or even society (Riedl et al., 2017). Others also relate to the concepts of digitalisation and DT as an ecosystem (Parida et al., 2019) which emphasises the need to observe multiple components and their relationships in any given context. Morakanyane et al. (2017) relates to DT as an evolutionary process that leverages

digital capabilities and technologies to enable business models, operational processes and customer experiences to create value. Skylar et al. (2017) reflect on the transformational power of digitalisation with reference to broader concepts in society rather than a single business which is most common. Others consider digitalisation and its potential to transform the relationship between citizens and government (e-Government or digital government) (Mergel et al., 2019). Sørensen (2016) observes the considerable capabilities for connectedness, distribution and scaling associated with DT.

Vial (2019) describes the DT process as starting with a disruption (e.g. changes in consumer's expectations/behaviour) that triggers strategic responses that in turn rely on the use of digital technologies (which also fuel disruptions). These technologies enable changes in value creation paths which are influenced by structural changes and organisational barriers. These changes may lead to negative or positive impacts. This description is however lacking from the perspective of CV where we are more interested in citizen's expectations and behaviours than consumers and are often dealing with a considerably more complicated and dynamic context in terms of structures, organisations, events, risks etc. CV takes place to a large degree in another domain, i.e. the private sphere, involving for example inter-citizen interactions and having its own set of required capabilities where the individuals themselves also have digital muscles. IS research on DT has however not yet truly embraced contexts similar to the CV context.

Herwix & Rosencraz (2018) write that paradigmatic boundaries established between Behavioural Science Research and design science in IS are too simplistic and fail to relate to current needs in IS research. They suggest taking steps to integrate design and behaviour orientated IS research. Drechsler and Hevner (2016) also have taken a step in this direction when they broadened their established three cycle design model with a "change and impact cycle". The purpose being to take second-order impacts of the design artefacts, in a wider organisational and societal context, into consideration, and not only those within the encompassing socio-technical system and more immediate application context. They motivate this extension by the need to also perform IS design projects in complex settings or "*wicked*" environments as well as to go beyond "*engineer-like*" simplistic notions regarding the introduction of an artefact into a context. This outlook furthermore poses the important question of how broader understandings required to drive DT in for example CV can be translated into the design of IT applications?

4. Research Approach and the Swedish Forest Fires Case

Extreme fire risk was observed in Sweden from early May 2018. By July the situation had escalated severely, and at the end of July and beginning of August several of the most critical forests fires started. The firefighting efforts that ensued are described by the Swedish Civil Contingencies Agency (MSB) as the biggest to ever take place within the European Union. The two municipalities in the north of Sweden that were observed in this research are among those locations most severely affected by the fires. These are sparsely populated areas where forestry is a key component of the local economy. Many of the individual fires were far beyond the capacity of local fire and rescue services and the, raged at up to five different locations simultaenly. This is when CV contributions escalated to involve in excess of 1600 individual volunteers over a period of more than two weeks.

The volunteer co-ordinators from these two municipalities alone managed in excess of 330 operative volunteers each day during this period.

This research adheres to a constructive ontology and applies an interpretive approach (Myers, 2009). A literature study was performed to gain an overview of key concepts such as CV, DT and IS Design, using a hermeneutic and semi-systematic approach (Boell & Cecez-Kecmanovic, 2014). Initial broad searches using terms related to IS, digitalisation and CV were followed by more refined searches using Google Scholar and Scopus databases. This process resulted in a final selection of approximately 150 ISCV papers and a further 110 papers on DT and IS Design. Semi-structured interviews were performed among an array of representatives for crisis management and crisis volunteerism in Sweden. Those interviewed were 1) Two volunteer co-ordinators (VC 1 and VC 2), one from each of the observed municipalities, 2) Fire and Rescue services Cheifs (FRSC 1 and FRSC 2) from the same municipalities, 3) The SRC crisis manager and a strategic advisor and 4) Two officials from the Swedish Civil Contingencies Agency (MSB Offical 1 and MSB Official 2). Participant observations were carried out on 15 occasions with the Swedish Red Cross (SRC) in the aftermath of the forest fires crisis to observe their CV development. A workshop with approximately 20 participants was performed with a Federation for Fire and Rescue Services in one of the affected regions. The empirical studies were aligned with the aims of participatory design. In the analysis of data from the literature study and empirical study themes and topics were identified, refined, evaluated and developed during the entire research process by reading and re-reading both literature and empirical results and cross-referencing sources to finally produce the CV and DT meta-model and characterisation of for example the environment component.

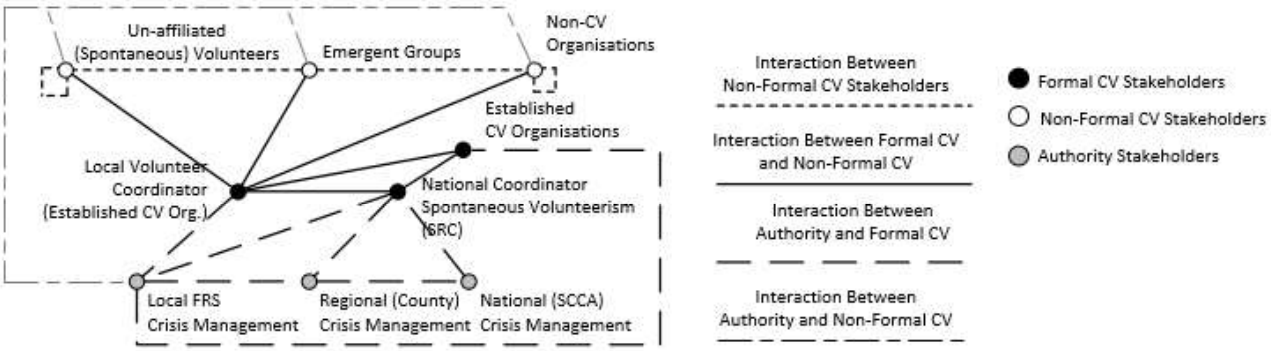
5. Results –The Swedish Crisis Environment

In Sweden the collaborative structures applied and established during the forest fires crisis of 2018 had varying degrees of formality and evolved during the entire crisis event. On the local level in the municipalities studied, two formal established CV organisations became the central coordinators of all forms of volunteer activity, including other established CV organisations, non-CV organisations (e.g. football clubs or churches), emergent groups (e.g. via social media) and unaffiliated individuals. Channels were also open between authorities and non-formal CV stakeholders according to local respondents. On the national level the SRC assumed responsibility for matching requests for volunteer assistance with offers of assistance from unaffiliated volunteers. Figure 2 demonstrates the complexity of the interactive structures observed in the response to the Swedish forest fires.

The social environment in municipality 1 and 2 can be characterised as rural and sparsely populated and was influenced by the fact that many were holidaying in the area at the time. The natural environment was characterised by high temperatures and drought during the spring with lightning storms and winds that influenced the development of the fires. Finally the physical environment included natural elements that both proved to be constraints and opportunities. Numerous lakes facilitated for example water bombing and forestry infrastructure could be used to access the fire locations while long distances and multiple fire locations provided challenges. Both Fire and Rescue Services (FRS) chiefs relate to the invaluable contribution of local farmers and entrepreneurs who provided much needed capacity in the response. They have however difficulties

saying if these resources are in fact voluntary or not. Underlying this confusion is the Swedish Act (2003:778) on Protection Against Accidents which incorporates a form of service conscription (Tjänsteplikt) at the discretion of the FRS. This law gives the FRS powers to conscript assistance among all citizens between the ages of 18 and 65, depending on the individual's health, qualifications and physical capabilities. It is stipulated that first choice should be made among those who volunteer their assistance. Due to the volume of volunteers and scale of operations, it was not possible to follow normal procedure for documenting and compensating those conscripted. FRSC 1 in particular relates to the ensuing difficulties in determining who in fact is a volunteer or not.

Figure 2: Interactions Observed in the Crisis Environment in the Swedish Forest Fires Crisis of 2018



In both local and national coordination volunteers cultural background was at times given relevance, for example noting challenges associated with the participation of volunteers with different cultural backgrounds. The influence of both explicit and tacit institutional arrangements (structures, norms, traditions, logics etc.) are however discussed at greater length. The impact of institutional arrangements in the crisis environment are noted to be relevant in creating and maintaining barriers for efficient and effective CV in Sweden. These barriers or dilemmas are for example a) an involvement exclusion paradox in relation to unaffiliated volunteers (FRSC and MSB respondents) whereby unaffiliated volunteer contributions, while required, are seldom recognised or unwelcomed by authorities, b) Uncertain expectations regarding the capacity of formal CV organisations (MSB respondents) and c) Lack of alignment of institutional arrangements in relation to the current reality of CV including spontaneity, episodic volunteerism and advanced self-organisation (all respondents' answers). These problems are interconnected. The MSB Official 2 points out the failings of public authorities in general, in terms of preparedness to use established CV organisations (18 formal established CV organisations appointed by MSB). MSB Official 1 also expresses extreme wariness and reluctance to consider unaffiliated volunteerism as worthy of development using digitalisation. While the considerable decline of capacity in established CV organisations in Sweden, ongoing for decades, is acknowledged by the MSB, there would appear to be a reluctance to acknowledge CV reality where citizens, thanks to digitalisation, have considerable powers to self-organise and respond spontaneously and independently of authorities.

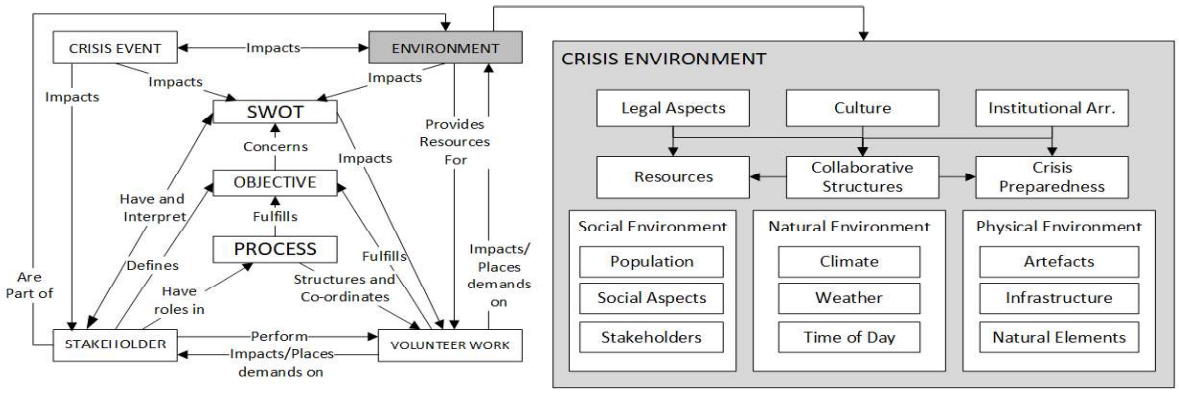
Local volunteer coordinators explain how they stepped in to fill the gaps they perceived in the authorities crisis respone. "*I saw chaos with volunteers stopping FRS from doing their jobs. We offered our services and took over the task (CV coordination)*" (VC1) "*Nobody was managing volunteers, so I grabbed a*

hold (of the task)" (VC2). The local volunteer coordinators demonstrate that institutional arrangements in Sweden were adapted to override the inclusion exclusion paradox and facilitate the participation of relevant volunteer resources, regardless of previous affiliation. The establishment of formal coordination was in other words spontaneous and unsupported by pre-made agreements as MSB Official 2 suggests should be the case. Discrepancies between the answers from local respective national MSB respondents can be presumed to stem from their different roles in crisis response. The local respondents related to their recent experiences from the forest fires and their natural access and capabilities to operationalise large scale coordination of volunteers, regardless of the volunteer's affiliation. The MSB officials on the other hand, are relating to the issue more so from a strategic view point for example emphasising the need for better crisis preparedness, viewing agreements between authorities and formal established CV organisations as the primary tool and do not show initiative to support the interests or needs of the local respondents as experienced during the forest fires. However MSB do recognise the need for a national volunteer coordination function and made arrangements with the national Swedish Red Cross to perform this function during the ongoing crisis which have also been extended in renewed agreements afterwards.

6. Conclusions and Discussion

The findings from the studies have been combined to compile Figure 1.

Figure 1: A Meta-model with the Key Components of Crisis Volunteerism with the Expanded Crisis Environment Component



This model relays the main components of the CV and DT meta-model and their relationships. The model expands the crisis environment component to demonstrate attributes of the component. This modelling approach, although similar to Bénaben et al. (2016) approach, differs in several respects. The model here is designed to embrace the broader concept of DT and not only IS design, the graphic representation is more simplified, and the crisis event component is broken out from the contextual/environment component and given a more prominent place in its own right.

Now to return to the research questions posed at the beginning of this paper. The first question was what do we need to know about CV and the crisis environment to facilitate IS design for CV? In section 3 it is clarified that it is necessary to take in broader (or secondary) contextual factors to a greater degree than has previously been custom in IS research on CV. It is also clarified that there is

a need to find ways to bridge the gap and translate these broader contextual factors into primary factors for the purposes of designing and developing specific IS applications. The literature study reveals a fragmented research area where little or no effort is devoted to providing a broader and more holistic understanding of CV. The meta-model presented here represents an attempt to piece together components identified in the literature study and demonstrate how it is possible to both zoom out to observe broader contextual factors and also zoom in to expand and develop a single component, as for is done with the crisis environment component in the results section.

The second question relates to the empirical context observed in this paper and asks, what are the implications of this research for crisis management and crisis volunteerism practitioners in Sweden? In the Swedish context the lack of digitalisation for CV suggests that the current route chosen by formal crisis management stakeholders (both authorities and volunteer organisations) has not seriously considered DT as an enabler. Input from the respondents suggests that that Swedish authority's visions, both local and national, are not aligned with the reality of CV during a large scale crisis when there are more interactions and stakeholders in play than are planned for. There are clearly institutional barriers. CV, although not fully acknowledged by crisis management, stands out in the results of this research as a distinct practice area in its own right covering a broad range of stakeholders and interactions deserving greater attention by both researchers and practitioners. Future research based on the CV metal-model has the potential to contribute to a significant improvement in the overall understanding required to take further steps to 1) observe what aspects of crisis volunteerism are most relevant to include in future public sector and e-government DT research and initiatives and 2) find better ways to communicate and translate contextual understandings to the IS application design and development stages.

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