Power as driver of inter-organizational information sharing in crises

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ABSTRACT

Research on decision-making and coordination in critical settings has provided important insights on resources and behaviors that improve emergency response. However, literature often assumes that decision-makers can access information when necessary, while empirical reality suggests that information is not always so easily accessed, but more or less shared between emergency actors. This research in progress aims to investigate how a specific organizational variable, power, influences information sharing behaviors' and its impact on emergency management. This research relies on two field studies to highlight in an inductive fashion a set of hypotheses on power in emergency organizations. We propose axes of investigation that map out ways to further explore the issue of power in emergency settings.

Keywords

Information sharing, decision-making, power in organizations, emergency

INTRODUCTION

In the response to sudden onset crises, responders need to act and coordinate in very short time, and most often they need to react without having a complete and comprehensive understanding of the situation (Hardy & Comfort 2014; Van de Walle & Comes 2014). Particularly if critical or high-risk infrastructures are affected, and consequences are far-reaching, responders need to work with experts and stakeholders from industry, policy-makers, the media, the population in the affected areas, and communication and transportation providers – to name just a few. The level of complexity of a crisis, however, rises with the increasing number of experts and stakeholders that need to be involved to respond to a crisis (Rao et al. 1995). Emergency response thus relies on efficient and fast information collection and communication, and literature has also highlighted how information sharing and access to information and knowledge can shape the response to a crisis (Van de Walle & Comes 2015).

Recognizing the pivotal role of information has resulted in a trend to involve an increasing number of stakeholders and volunteers as information providers and analysts, or to crowd source information and data in the response to sudden onset crises. While access to information is partly planned, some crucial decisions made during emergencies proved to nourish from emergent information sharing. For instance, in the aftermath of 2010 Haïti earthquake, emergency responders could benefit from frequently updated information provided from the Crisis Mappers Community through Open Street Map, or Ushahidi (Crowley & Chan 2010; Altay & Labonte 2014). Without any notice, Geoeye, a start-up, provided access to satellite images to Internet users who, from the world wide web, updated the OSM, which supported emergency rescue.

Besides the often debated aspects of information reliability and trustworthiness (Mendoza et al. 2010), there is also the much less studied dimension of power relations. During crises, knowledge and authority are often separated, and thus create an organizational imbalance (Suparamaniam & Dekker 2003). Therefore, we propose in this paper some axis of investigation to investigate in this research in order to further understand the influence of power on inter-organizational information sharing. To propose these axes, we rely on an exploratory

Short Paper – Intelligent Decision Support in the Networked Society
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Tapia, Antunes, Bañuls, Moore and Porto,eds.

empirical investigation on inter-organizational information sharing that compares a case from European crisis response with the humanitarian in a sudden-onset disaster.

WHAT MAKES ORGANIZATIONS SHARE INFORMATION IN CRISES?

Today, information is considered widely as a primary asset that needs to be produced, retrieved, processed, enriched, validated, consumed and/or distributed in intra- and inter-organizational networks (Bharosa et al. 2009). As a consequence, information sharing has been frequently reported as a crucial support to emergency response (Yates & Paquette 2011) and disaster management (Van de Walle & Comes 2015). Information sharing can be defined as a voluntary act of making information available to others (Jarvenpaa & Staples 2000). Following Yang & Maxwell (2011), we distinguish interpersonal information sharing (between individuals) from intra- and inter-organizational sharing. In all cases, the aim of sharing information is to support decision-making, coordination and facilitate collaboration between individuals, groups or organizations. In this paper, we focus on the inter-organizational information sharing, and put aside questions related to technical interoperability between information systems.

First of all, decision makers rely on a large spectrum of information to make sense of the situation (Wolbers & Boersma 2013). Sensemaking is, quite literally, the making of sense, i.e., the process by which people give meaning to what is happening in order to reduce the equivocality and ambiguity that surrounds them (Weick 1993). As a result, decision-makers face the challenge to collect, interpret and use information that is accessible from multiple sources and sites in a timely manner (Zhang, Zhou and Nunamaker Jr, 2002).

Secondly, information sharing is fundamental to coordination: in order to accomplish an effective response to a crisis, response teams typically divide the task and assign components of the task to different members of the team. Coordination hence requires prioritization and distribution of tasks. Along with task assignment also the autonomy and decision power to perform the mission or provide the required services need to go to the responsible person in the field (Turoff et al. 2004). However, actions and tasks need to be monitored and controlled, and potentially adapted to the ever changing environment – requiring coordination (Comfort 2007). While typically a lot of attention is paid to an efficient initial division of tasks and task assignment, the equally important and difficult task of sharing information and updating tasks or distribution of teams is often neglected (Schryen et al. 2015; Zook et al. 2010). In complex situations where the division of labor is oriented towards highly specialized disciplines (such as firefighting, policing or medical services) that focus on their respective information and decision making challenges, and use their respective jargon, coordination is even more difficult due to a lack of inter-organizational communication and translation across experts (Heath and Staudenmayer 2000).

Despite growing scholar interest in inter-organizational information sharing, knowledge of information sharing behaviors and dynamics in emergency response remains scarce (Allen, Karanasios and Norman, 2013). Yang and Maxwell provide an extensive review of organizational drivers of inter-organizational information sharing, such as governance (Cumbie and Sankar, 2012), information culture, information stewardship, boundary spanners (Kapucu, 2006),…. Yang and Maxwell highlight that information is per se a source of power, suggesting that power can shape information sharing behaviors. We also consider that information sharing is unpredictable in that every crisis is unique and most of the time goes beyond any preconception (Waugh and Streib, 2006).

POWER IN ORGANIZATIONS IN CRISIS RESPONSE

Power is an old concept in organization theory and has been extensively documented since the beginning of the 20th century. Power refers to a bilateral relation between two individuals (or groups of individuals): A's power on B depends on A's capacity to make B execute specific tasks that B would not execute without A's order. Thus power is inherently a relational and multilevel concept in that it can refer to individuals but also groups and organizations. Power might be challenging to investigate, for several reasons: first of all, power is unstable and invisible (Brown, Kornberger, Clegg and Carter, 2010).

Power in organization has been reported to play an essential influence on its members' likelihood to share or retain information (Constant et al. 1994). Information being a central resource for coordination, one can infer that power structures – even across organizations, when there is no formal mandate and power-relation – indirectly shapes decision-making and action in crisis response. Earlier research identified that various attitudinal variables that influence information sharing are related to power. In particular, Constant and

Short Paper – Intelligent Decision Support in the Networked Society
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Tapia, Antunes, Bañuls, Moore and Porto, eds.

colleagues identified that balance of power, among self interest, simple reciprocity, social and organizational context and perception of information as a social good, can make individuals share rather than retain information. However, power has only been documented as one of the variables that can shape information sharing in crisis settings.

In critical settings, power relations are highly unstable. Quarantelli (1988) identified two major problems related to power and authority to make decisions related to the emergent and unpredictable nature of crises: conflict over authority regarding new tasks, and clashes over organizational domains between established and emergent groups. To mitigate this problem, it has been advocated that information systems should support "*the flow of authority directed towards where the action takes place, usually on a low hierarchical level*" (Van de Walle & Turoff 2008). Despite those recommendations, our cases from crisis and disaster management provide examples of organizations unwilling to delegate power, driven by a lack of domain expertise or knowledge to make a decision, or a lack of legitimacy to coordinate or enforce these decisions' implementation. In addition, the shifting roles of organizations in crises require a deep understanding of power dynamics and their effects on inter-organizational information sharing.

Although a theoretical understanding of the implications of volatile power structures coupled with a dynamic information ecosystem are lacking, practitioners have, most of the time, an intuitive understanding and comply to tacit norms of information sharing, for instance documented for the Middle East (Van de Walle & Comes 2015). However, neither in research nor in practice, there is a clear understanding of how power impacts information sharing and collective action when a crisis strikes.

EMPIRICAL EXPLORATORY INVESTIGATION

The hypotheses are built from literature review and inductive analysis of two case studies. The first case corresponds to a firefighting organization in Europe. The second case refers to coordination in the context of a humanitarian response. Both cases entail decision making in emergency, and sometimes critical, situations. In both cases, information sharing was shaped by power.

Case 1: Information Sharing in Emergency Management – Train Accident

The firefighting organization under study (called "Alpha" here) is in charge of public safety and fire interventions in a French department of more than 1.100.000 habitants. Each year, Alpha is in charge of more than 80.000 operations involving more than 3.500 individuals, including firefighting professionals, volunteers, and administrative personnel. Alpha operates in a region that combines dense urban areas, rural areas, and transportation axes that are both busy and crucial to the regional economic activity. For this reason, Alpha has been developing strong ties with counterparts in surrounding departments and other organizations such as health care, Police services, authorities, transportation organizations. Alpha developed a local platform dedicated to internal alerting and information sharing from the field to local command. In addition, Alpha has become a strong user of a regional platform for information sharing and the development of closer collaborative and cooperative ties between police, health care, civil protection services.

In July 2013, a train derailed in the suburbs of a major French city. The accident occurred during on the busiest time of the day. Alpha was primarily involved in the response to this accident, together with many other organizations, such health care services or the railway company. In addition to operations, regional institutions were in charge of supplying additional resources and coordination. Decision-making was complex due to the large number of organizations involved and the uncertainty about the fatalities and the causes of the accident. Decision makers had to assess whether the accident resulted from a terrorist attack, and if further attacks were to be expected that could harm rescuers in the course of action. Particularly initially, in the chaotic phase of the response, they found it hard to make sense of the situation. However, organizations successfully evacuated around 250 victims in less than five hours.

Reports established that information sharing between organizations involved on the field response to the accident was not optimal, which complicated coordination. For instance, emergency units from several organizations arrived without informing all others. As a result, emergency vehicles were parked without proper coordination and were obstacles for responders to access to the field. Some organizations felt the urge to arrive once they heard about the accident, showing off their reliability. Competition for legitimacy and power seems to have significantly shaped information sharing and competition.

Short Paper – Intelligent Decision Support in the Networked Society
Proceedings of the ISCRAM 2016 Conference – Rio de Janeiro, Brazil, May 2016
Tapia, Antunes, Bañuls, Moore and Porto, eds.

Case 2: Information sharing in Humanitarian Disasters – the Ebola Response

The findings reported in this paper stem from field research on the West African Ebola Outbreak conducted in December 2014. Statistics by CDC (as of January 17th, 2016) count more than 11,300 deaths across several West African countries, most notably Liberia, Sierra Leone and Guinea. Although Ebola has been described as the health disaster by many, information – and the difficulty to access reliable and timely information – played a vital role in the response. The characteristics of the disaster also lead to the set-up of a new coordinating body, the UN Mission for the Ebola Emergency Response (UNMEER) in October 2014, i.e., two months before the field research reported here.

Humanitarian disaster management requires the coordination of international relief organizations with the local and national relief efforts. To streamline activities, the UN typically activates their "cluster approach", an elaborate coordination mechanism grouping humanitarian organizations into functional areas to prioritize the provision of staff, funds and other resources (IASC 2012). Information Management (IM) is performed within each cluster, but is also crucial for inter-cluster coordination. While there are well-established guidelines for humanitarian IM (Van de Walle et al. 2009), the most important information in Ebola referred to patient data – information that is usually treated confidentially. IM guidelines needed to be redefined carefully within UNMEER, through a so-called IM Directive. Agreeing on this Directive took considerable time and effort, and interviewees reported on "*many little policy fights*". And while the directive was being put in place, information management offers were operating in a void lacking guidance from an overarching coordinative body.

Obtaining information from the field also was described as a huge challenge, not in the least because of multiple communication lines among the responding organizations, and the lack of standardization and comparability between countries. Moreover, it was decided that some of the standard tools such as the Virtual OSOCC, or commercial collaborative tools such as Google spreadsheets should not be used. Excel files saved in dropbox or shared via email, were standard tools for information sharing, with the typical problems of versioning. The case of Ebola is as such an interesting example providing insights into the parallel development of power, coordination and information sharing structures. Inter-organizational information sharing was hampered by not-existing or emergent lines of authority. Lacking a clear coordination structure, information flows were organized intra-organizationally, dominated by reporting to headquarters. In the words of an interviewee: "*A lot of information that we need is going directly to Geneva, and not shared with us, although it is really important*."

A PROPOSAL FOR INVESTIGATION

Our proposal stems from literature investigation and analysis of two empirical cases but requires refinement. Further exploration of the two cases will lead to further investigation of the following axes:

- To what extent power can have a positive/negative influence on information sharing? Even though empirical cases suggest that power can impede inter-organizational information sharing, data suggests that individuals who feel legitimate enough (from intra and inter-organizational perspectives) can share more information than planned and stimulate coordination.

- How can power influence information transmission in emergency organizations? We need to specify the causality from power related dynamics to information transmission

- What sources of power come at play in information sharing? Not only power is a multidimensional concept but we also identified several dimensions of power as drivers of information sharing: legitimacy, knowledge, access to information, etc. Therefore the next step of this research is to identify the dimensions of components of power that actually influence information transmission.

REFERENCES

1. Cumbie, B.A., Sankar, C.S. (2012) Choice of governance mechanisms to promote information sharing via boundary objects in the disaster recovery process, *Information Systems Frontiers,* 14, 1079-1094.
2. Kapucu, N. (2006) Interagency Communication Networks During Emergencies: Boundary Spanners in Multiagency Coordination, *American Review of Public Administration,* 36, 207-225.
3. Waugh, W.L., Streib, G. (2006) Collaboration and Leadership for Effective Emergency Management, *Public Administration Review,* 66, 131-140.

Short Paper – Intelligent Decision Support in the Networked Society
Proceedings of the ISCRAM 2016 Conference – Rio de Janeiro, Brazil, May 2016
Tapia, Antunes, Bañuls, Moore and Porto,eds.

4. Zhang, D., Zhou, L., Nunamaker Jr, J.F. (2002) A knowledge management framework for the support of decision making in humanitarian assistance/disaster relief, *Knowledge and Information Systems,* 4, 370-385.

5. Allen, D.K., Karanasios, S., Norman, A. (2013) Information sharing and interoperability: the case of major incident management, *European Journal of Information Systems,* 1-15.

6. Altay, N. & Labonte, M. (2014) Challenges in humanitarian information management and exchange: Evidence from Haiti. *Disasters*, 38, 1, 50-72.

7. Bharosa, N., Lee, J. & Janssen, M. (2009) Challenges and obstacles in sharing and coordinating information during multi-agency disaster response: Propositions from field exercises. *Information Systems Frontiers*, 12, 1, 49–65.

8. Brown, A.D., Kornberger, M., Clegg, S.R., Carter, C. (2010) 'Invisible walls' and 'silent hierarchies': A case study of power relations in an architecture firm, *Human Relations,* 63, 525-549.

9. Chan, J. & Comes, T. (2014). Innovative Research Design – A Journey into the Information Typhoon. *Procedia Engineering*, 78, 52–58.

10. Comes, T. (2016) Cognitive and Motivational Biases in Humanitarian Sensemaking and Decision-Making. In *IEEE International Multi-Disciplinary Conference on Cognitive Methods in Situation Awareness and Decision Support (CogSIMA)*. San Diego.

11. Comes, T., Hiete, M., Wijngaards, N. & Schultmann, F. (2011) Decision Maps: A framework for multi-criteria decision support under severe uncertainty. *Decision Support Systems*, 52, 1, pp.108–118.

12. Comfort, L.K. (2007) Crisis Management in Hindsight: Cognition, Communication, Coordination, and Control. *Public Administration Review*, 67,189–197.

13. Constant, D. et al. (1994) What ' s Mine Is Ours , or Is It ? A Study of Attitudes about Information Sharing. *Information Systems Research*, 5, 4, 400–421.

14. Crowley, J. & Chan, J. (2010) *Disaster Relief 2.0: The future of information sharing in humanitarian emergencies*, Washington D.C..

15. Hardy, K. & Comfort, L.K. (2014) Dynamic decision processes in complex, high-risk operations: The Yarnell Hill Fire, June 30, 2013, *Safety Science*, 71, 39–47.

16. Hinsz, V.B., Tindale, R.S. & Vollrath, D.A. (1997) The emerging conceptualization of groups as information processors, *Psychological Bulletin*, 121, 1, 43–64.

17. Holguín-Veras, J., Jaller, M., Van Wassenhove, L. N., Pérez, N., & Wachtendorf, T. (2012) On the unique features of post-disaster humanitarian logistics, *Journal of Operations Management*, 30, 7-8, 494–506.

18. IASC (2012),*Operational Guidance for Coordinated Assessments in Humanitarian Crises*, Geneva.

19. Jarvenpaa, S.L. & Staples, D.S. (2000) The use of collaborative electronic media for information sharing: an exploratory study of determinants, *The Journal of Strategic Information Systems*, 9, 2,129–154.

20. Lipshitz, R., Klein, G., Orasanu, J., & Salas, E. (2001) Taking stock of naturalistic decision making, *Journal of Behavioral Decision Making*, 14(5), 331–352.

21. Mendoza, M., Poblete, B. & Castillo, C. (2010) Twitter Under Crisis: Can we trust what we RT? In *Workshop on Social Media Analytics*. ACM, 9.

22. Quarantelli, E.L. (1988) Disaster Crisis Management: A Summary of Resarch Findings. *Journal of Management Studies*, 25, 4, 373–385.

23. Rao, H.R., Chaudhury, A. & Chakka, M. (1995) Modeling Team Processes: Issues and a Specific Example. *Information Systems Research*, 6, 3, 255–285.

24. Schryen, G., Rauchecker, G. & Comes, T. (2015) Resource Planning in Disaster Response - Decision Support Models and Methodologies. *Business & Information Systems Engineering (BISE)*, 57, 4, 243-259.

25. Stasser, G. & Titus, W. (1985) Pooling of unshared information in group decision making: Biased information sampling during discussion. *Journal of Personality and Social Psychology*, 48, 6, 1467–1478.

26. Suparamaniam, N. & Dekker, S. (2003) Paradoxes of power: the separation of knowledge and authority in international disaster relief work. *Disaster Prevention and Management*, 12, 4, 312–318.

27. Turoff, M., Chumer, M., Van de Walle, B., & Yao, X. (2004) The design of a dynamic emergency response management information system. *Journal of Information Technology Theory and Applications*, 5, 4, 1–36.

28. Van de Walle, B. & Comes, T. (2015) On the Nature of Information Management in Complex and Natural Disasters. *Humanitarian Technology: Science, Systems and Global Impact*, 107, 403–411.

Short Paper – Intelligent Decision Support in the Networked Society
Proceedings of the ISCRAM 2016 Conference – Rio de Janeiro, Brazil, May 2016
Tapia, Antunes, Bañuls, Moore and Porto,eds.

29. Van de Walle, B. & Comes, T. (2014) Risk Accelerators in Disasters. Insights from the Typhoon Haiyan Response on Humanitarian Information Management and Decision Support. In M. Jarke, J. Mylopoulos, & C. Quix, eds. *CAiSE2014*. Thessaloniki, Greece: Springer Berlin / Heidelberg, 12–23.

30. Van de Walle, B., Van Den Eede, G. & Muhren, W. (2009) Humanitarian Information Management and Systems. In J. Loeffler; & M. Klann, eds. *LNCS*. Springer Berlin / Heidelberg, 12–21.

31. Van de Walle, B. & Turoff, M. (2008) Decision support for emergency situations. *Information Systems and E-Business Management*, 6, 3, 295–316.

32. Weick, K., Sutcliffe, K. & Obstfeld, D. (1999) Organizing for high reliability: Processes of collective mindfulness. *Research in organizational behavior*, 21, 23 – 81.

33. Weick, K.E., 1993. The Collapse of Sensemaking in Organizations: The Mann Gulch Disaster. *Administrative Science Quarterly*, 38, 4, 628–652.

34. Wolbers, J. & Boersma, K. (2013) The Common Operational Picture as Collective Sensemaking. *Journal of Contingencies and Crisis Management*, 21, 4,186–199.

35. Yang, T.M. & Maxwell, T.A. (2011) Information-sharing in public organizations: A literature review of interpersonal, intra-organizational and inter-organizational success factors. *Government Information Quarterly*, 28, 164–175.

36. Yates, D. & Paquette, S. (2011) Emergency knowledge management and social media technologies: A case study of the 2010 Haitian earthquake. *International Journal of Information Management*, 31, 1, 6–13.

37. Zook, M., Graham, M., Shelton, T., & Gorman, S. (2010) Volunteered Geographic Information and Crowdsourcing Disaster Relief: A Case Study of the Haitian Earthquake. *World Medical & Health Policy*, 2 ,2, 6–32.

Short Paper – Intelligent Decision Support in the Networked Society
Proceedings of the ISCRAM 2016 Conference – Rio de Janeiro, Brazil, May 2016
Tapia, Antunes, Bañuls, Moore and Porto,eds.