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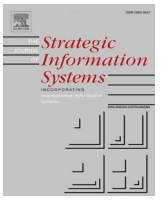

The strategic value of IT-enabled self-organised collectives during crises

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ABSTRACT

There is a promising body of work pertaining to the strategic value of IT-enabled self-organised collectives in times of crisis. This area is of significant theoretical and practical importance. Yet, we still have little systematic knowledge about precisely how self-organised collectives contribute during crises and how the value of their contributions might be leveraged strategically. To address this, we develop a model to demonstrate four dimensions across which self-organised collectives create strategic value: (i) information sharing value; (ii) collective resource-mobilisation value; (iii) network value; and (iv) generative value. In doing so, we reveal more about the specific capabilities of self-organised collectives, and we use these insights to develop implications for theory. We conclude by outlining an agenda to encourage and accelerate future research on the role of IT-enabled self-organised collectives during crises.

Introduction

Crises are specific, unexpected events which create high levels of uncertainty. Whether societal, natural, or organisational, crises are characterised by threats to well-being, values, and goals (Seeger et al., 1998; Falkheimer & Heide, 2006; Sakurai & Chughtai, 2020). Periods of crisis typically involve multiple private and public organisations and agencies working together to achieve crisis resolution (Leidner et al., 2009). This is critical as crises – such as infrastructure breakdowns, political unrest, service failures, violent attacks, pandemics, and natural disasters – pose a substantial threat to the strategies of organisations, and their strategic direction and goals (Eismann et al., 2021).

Research on crises has highlighted the important role of information and information technology (IT) (e.g., Housel et al., 1986; Pan et al., 2012; Oh et al., 2013; Nan & Lu, 2014; Tarafdar and Kajal Ray, 2021; Venkatesan et al., 2021), and how organisations or actors use IT to alleviate the impact of crises (Leidner et al., 2009). Often, such responses are developed from a tacit understanding of the role of strategic management during crises. Strategy is a central means for ensuring the success of organisations, through the development of increasingly sophisticated approaches to managing turbulent and hostile conditions, for the benefit of their stakeholders (Richardson, 1994). Research adopting a strategic perspective in times of crisis is varied, from describing types and phases of crisis management, to crisis decision processes, outlining communication strategies, and creating crisis network designs (Leidner et al., 2009; Pan et al., 2012).

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A growing stream of work in the information systems (IS) field has complemented such research by focusing on the role of IT during crises and their ability to enable strategic value for urgent information collection, communication, and learning for actors (e.g., Majchrzak et al., 2007; Leidner et al., 2009; Pan et al., 2012; Lin et al., 2016; Eismann et al., 2021). Within this stream, *self-organised collectives enabled by IT (self-organised collectives* hereafter) – notably crowds, communities, social movements, and meta-organisations – are also increasingly discussed as generating important capabilities, as part of their strategic value across various natural and social/human-made crises. Examples of self-organised collectives in such contexts includes: the evacuation and volunteer activities using Facebook during disastrous flooding events (Leong et al., 2015); crowd-managed inspections of restaurant hygiene during foodborne illness epidemics (Mejia et al., 2019); integrated information ecosystem of government, business, and individuals for sustainable development (Corbett & Mellouli, 2017); networks of micro-bloggers aiding information-seeking and diffusion during emergencies (Cheng et al. 2011); and emergent online communities of university academics and students managing the consequences of an earthquake (Nan & Lu, 2014).

Such collectives are characterised by emergence and self-organisation which is in contrast to the planned approach to crisis management whereby traditional actors (e.g., government, security, and emergency services) follow pre-planned and pre-defined protocols in addressing crises. In this regard, self-organised collectives provide novel pathways to crisis management as they mainly evolve along with the crisis phenomenon rather than ex-ante preparatory actions. Therefore, examining the value creation of such collectives is paramount for understanding their potential role and behaviour in times of crisis.

Often, communities and crowds develop more effective crisis responses than traditional organisations (Oh et al., 2011; Oh et al., 2013; Nan & Lu, 2014) and act not as reactive 'victims' but as competent actors whose self-organised, resourcing and network value is significantly empowered by IT (Leong et al., 2015; Majchrzak & Malhotra, 2020). Whilst the strategic value and the capabilities of organisations and strategic management processes during crises is well established, there remains a need to explore and unpack the strategic value and specific capabilities of self-organised collectives in such situations. We still have little systematic knowledge about precisely how self-organised collectives contribute to crises and how the value of their contributions enables capabilities that might be leveraged strategically. Given the increasing frequency and scale of crises in the modern world, opening this black box is of significant theoretical and practical importance. Employing new forms of organising enabled by IT (Puranam et al., 2014) during fast-developing phenomena (Faraj et al., 2016), where resource generation, ownership, information sharing, and division of labour markedly differ from those in traditional organisations (Puranam et al., 2014; Benkler, 2017; Zorina, 2021), self-organised collectives provide important, novel sites for IS scholars and those in the wider Management field to advance existing knowledge on crisis management.

Therefore, in this paper, we theorise the strategic value of self-organised collectives in times of crisis. We provide a rich, illustrative overview of future areas of research through construction of a novel research agenda. In doing so, our work builds on existing research in this area and reviews literature from across leading IS journals. Our research questions are therefore guided by the need to theorise more about the types and roles of strategic value created by IT-enabled self-organised collectives during crises. We propose the following two questions:

(1) What is the role of IT in enabling self-organised collectives during crises?
(2) What strategic value and capabilities do these self-organised collectives bring during crises?

Our paper proceeds with an overview of our method for reviewing extant literature. This is followed by our findings which are built around four dimensions showing the strategic value of self-organised collectives in relation to crises. We then develop a model of strategic value and capabilities of self-organised collectives during crises and conclude with an illustrative research agenda to encourage and guide further work in this area.

Method

Our review aims to theorise in relation to a specified "gap identified during the process of gap identification", where our broad contribution can be thought of as a "gap filling theory" (Leidner, 2018, p.566). Our specific identified 'gap' was that an evaluation of the role of self-organised collectives during crises was needed, and that there is scope (and a need) to theorise in this area. To complement this aim, we also had ambitions to develop a research agenda based on the assessment of trends and promising areas for further research. We followed recognised steps to ensure our review was comprehensive in scope by including all relevant material together with steps for excluding literature (Okoli, 2015). As our review progressed, we adopted clear steps for literature search and selection, and coding and analysis, as documented in the following sections.

Literature search and selection

We began our literature search logically by focusing on high-ranked IS journals (the AIS Senior Scholars' Basket of Eight Journals). However, we also, where relevant, included a selection of papers from additional information systems journals. This was essential to appraising the quality of the selected papers (Okoli, 2015). Our overall outline of journals and selection criteria is shown in the Appendix, along with a set of keywords that formed the search terms used and the results.

We had two main rounds of search and selection. In the first round, we searched using our broad search terms and removed duplicate results where appropriate. We read the titles and abstracts of the papers to check whether the search terms had been fruitful in finding relevant papers. We then began to read papers, where needed, in more depth. This helped us to exclude papers where crises and self-organised collectives were not a central focus, or where their mention was untheorised or ambiguous. We also excluded papers

in which information/digital technologies were not a core concept. This exclusion of papers yielded 231 potential papers from the initial search results.

In the second round, we began to closely engage with the papers and read all of them in full. We also started to narrow our search using a set of exclusion criteria. These exclusion criteria were built from our understanding of the selected papers so far, including the focus on different types of self-organised collectives that are prominent in prior work (i.e., crowds, communities, social movements, and meta-organisations) and on crisis management and related themes in IS literature. Specifically, the papers were checked against four main criteria: (i) the relevance and type of collective identified, (ii) the role of information technology, (iii) organisational aspects of the self-organised collectives, and (iv) the relationship with crises.

These comprehensive criteria supported our aim to map the current state of knowledge in relation to self-organised collectives and their role in times of crisis, and to identify potential avenues for future research. We excluded a further 157 papers, leaving a total of 74 papers. The final 74 papers across 16 journals were read in full. For comprehensiveness in the search for literature (Okoli, 2015), as a final step, we performed a backward analysis to capture any missed studies cited in the selected papers that satisfied our criteria. The composition of papers, in relation to journal criteria (AIS Senior Scholars' Basket of Eight Journals, and Additional Information Systems Journals) is detailed in Table 1.

Literature coding and analysis

We organised our selected papers within a database for all authors to access and discuss. We began by agreeing upon a set of criteria through which to analyse the literature and to provide an overview of each paper in relation to these criteria. This allowed us to broadly map the current state of knowledge in relation to our focus area and begin to identify emergent themes (Leidner, 2018). This was a crucial means to reduce and extract meaning from each of the papers and to understand them and develop our own interpretation. At this stage, we developed definitions for the different types of self-organised collectives in the reviewed papers to ensure clarity in terms of the concepts we were analysing (Suddaby, 2010). This is shown in Table 2.

We used a coding approach common in qualitative research (Gioia et al., 2013) and this was deemed appropriate for coding our selected papers as it enabled synthesis of the literature (Miles and Huberman, 1994). The approach involved three core stages which resulted in our findings and our model, which are discussed later in the paper.

In the first stage, we sought to identify: (i) the role of information technology in enabling self-organised collectives; (ii) the types of crisis situation at-hand in each paper; and (iii) the strategic value of self-organised collectives during crises. The coding involved going through each paper to assign short labels to ascertain its meaning (Gioia et al., 2013). This started with the identification of granular initial codes. In our database, we created a summary of each paper, the type of IT present and how it is used, information about the crisis situation, and information about the type of collective present. As codes were grouped and refined to be given more consistent labels, it helped us to unpack the richness of the papers relevant to a number of themes which emphasised the strategic value of self-organised collectives. This coding process went through iterations until we were satisfied that the papers had been sufficiently reviewed.

In the second stage, we went through iterations and discussions between the authors, and this helped to provide commentary and verification about the emerging themes. We then updated our codes in the database, and this allowed for further discussion and inter-coder dependability to finalise these in-line with the research background on the strategic value of self-organised collectives during crises. We then sought to move our codes into higher-order themes (Gioia et al., 2013). This resulted in four main dimensions of strategic value (i.e., information sharing value, collective resource-mobilisation value, network value, and generative value) which we used to begin to develop rich narratives. In turn, these formed the basis for our findings.

This led to the third and final stage, where all authors worked together to translate the insights from our database and identified dimensions to draw clear implications from our work. Specifically, by using our understanding of the papers and our understanding of relevant literature, we established a model to display the core findings (Miles and Huberman, 1994). Overall, our approach aligned with the need to demonstrate comprehensiveness in the search for, and analysis of, the literature (Okoli, 2015).

Table 1
Composition of selected papers by journal criteria.

Journal criteria	Number of papers	Journals included
AIS Senior Scholars' Basket of Eight Journals	55	European Journal of Information Systems, Information Systems Journal, Information Systems Research, Journal of Information Technology, Journal of Management Information Systems, Journal of Strategic Information Systems, Journal of the Association for Information Systems, MIS Quarterly
Additional Information Systems Journals	19	Communications of the Association for Information Systems; Computers in Human Behavior; Decision Support Systems; Information & Organization; Information, Communication & Society; Information Systems Frontiers; International Journal of Information Management; Pacific Asia Journal of the Association for Information Systems

Table 2
Types of key self-organised collectives and their role during crises.

Type of self-organised collective	Definition of role during crises
Communities	*Distributed collectives of heterogeneous actors with shared values and beliefs in relation to crises.*
Crowds	*Random collectives of heterogeneous actors that are experiencing similar situations/challenges during crises and are brought together on the same platform*
Social movements	*An emergent collective of people who share a similar vision and aligned goals for addressing crises*
Meta-organisations	*Temporary assembles of heterogeneous actors working together during crisis situations where each actor has their own motivations, incentives, and cognitions and might access their partners' material, cognitive, or network resources (adapted from* Gulati et al., 2012*)*

Findings

Our analysis revealed four different types of self-organised collectives that have a role during crises: (i) communities, (ii) crowds, (iii) social movements, and (iv) meta-organisations. We provide a list of exemplar studies on these types in Table 3.

As Table 3 also illustrates, key IT that enable the self-organised collectives to act during crises include various forms of social media (e.g., Twitter, Facebook, YouTube), specialised platforms developed for crisis management (e.g., change.org, climate change platforms, CrowdMed medical platform), as well as specialised platforms developed for other purposes but used during crises, as was the case with web-conferencing systems (e.g., Zoom) during the Covid-19 pandemic (Hacker et al 2020). The use of such IT is similar across both social/human-made and natural crises. Table 4 provides further details about specific types of IT that support each type of self-organised collective. Knowledge about such IT is informative since research increasingly acknowledges the important role that they play in enabling the action of self-organised collectives (Oh et al., 2015; Leong et al., 2019; Mirbabaie et al., 2020) as well as challenges associated with them (Hacker et al 2020; Marabelli et al., 2021). Notably, our analysis shows that self-organised collectives of different types provide value for both natural crises (e.g., earthquakes, flooding) and social/human-made crises (e.g., social upheaval, political unrest).

Our analysis has revealed four dimensions across which these types of self-organised collectives create strategic value during crises: (i) information sharing value; (ii) collective resource-mobilisation value; (iii) network value; and (iv) generative value. We summarise key aspects about these types of value in Table 5 and discuss each in more depth below.

Information sharing value

We found that fast and up-to-date information provision and sharing, supported by a variety of IT (see Table 5), is a primary form of strategic value created by self-organised collectives during crises (Pan et al., 2012; Leong et al., 2015; Yang et al., 2015; Hacker et al., 2020). Given the disruption and fragmentation of established information channels and networks during a crisis, information sharing contributes to resilience in such situations (Sakurai & Chughtai, 2020). In addition, it also enables communication and connection between otherwise disconnected, heterogeneous actors who might have different capabilities, resources, values, and perspectives on how to address crises (Pan et al., 2012; Hale, 2015; Selander & Järvenpää, 2016; Lai et al., 2017; Han et al., 2020). In some contexts – such as in cases of rapid-response, spontaneous virtual teams, or where traditional infrastructures have been damaged by natural disasters – information collection and communication tools are critical for accessing accurate information and developing shared understanding, knowledge, and belief systems (Leidner et al., 2009; Oh et al., 2011; Takahashi et al., 2015; Yang et al., 2015; Brengarth & Mujkic, 2016; Tim et al., 2017; Kim et al., 2018; Mirbabaie et al., 2020). Notably, this is also true for large self-organised collectives in unstable social and informational environments (e.g., political crises, and where fake news is prominent) whereby actors use Twitter hashtags or similar microblogging or social media features to develop a system that supports collective sense-making and information sharing (Oh et al., 2015; Vaast et al., 2017; Mejia et al. 2019). The value of IT for enabling, and to some extent even shaping, self-organised collective actions is particularly acknowledged in works on social movements. For example, such social movements show a phenomenon of 'collectivity' that acts toward attaining or resisting change by social groups (Oh et al., 2013; Oh et al., 2015; Venkatesan et al., 2021). Another important area of discussion relates to the value of IT features and affordances and how these are perceived and used as capabilities[1] (Hale, 2015) in enabling the collective action of self-organised actors. For example, technology affordances such as ease of communication enable self-organising without a need to involve existing organisations (Bennett & Segerberg, 2011; Yang et al., 2015; Chen et al., 2019). In a similar way, other affordances such as direct messaging help information sharing about specific crises and the need for resource-mobilisation (Yates & Paquette, 2011; Oh et al., 2013; Nan & Lu, 2014; Venkatesan et al., 2021). Some of these affordances (e.g., 'likes', sharing) provide novel abilities in addressing crises, such as enabling engagement of the crowd in impersonal ways and without a need for direct interactions (Majchrzak et al., 2013; Selander & Järvenpää, 2016; Poblet et al., 2018). In turn, this motivates re-mixing of knowledge from actors involved in diverse contexts (Han et al., 2020), or bridges geographic and social distance in a crisis (Hacker et al., 2020). The combination of such novel affordances enhances the resilience of people, communities, and organisations by strengthening their ability to adapt to exogenous shocks, uncertainty, and transition to a restoration of order in society (Sakurai & Chughtai, 2020). In this regard, some research suggests that IT use by self-

[1] mutuality of actor intentions and information technology capabilities that provide the potential for a particular action (Majchrzak et al. 2013, p. 39; Leonardi 2013; 2014).

Table 3
Exemplar studies of self-organised collectives and the role of key information technologies during different crises.

	Social/human-made crises *Examples: social and political unrest, phishing attacks, hygiene/safety crises*	**Natural crises** *Examples: flooding, earthquakes, Covid-19 pandemic*
Key self-organised collective	Communities (e.g., Avgerou, 2013; Hauser et al 2017; Dissanayake et al., 2019) Crowds (e.g., Oh et al., 2015) Social movements (e.g., Selander & Järvenpää, 2016; Leong et al., 2019; Stewart & Schultze, 2019; Venkatesan et al., 2021) Meta-organisations (e.g., Mejia et al., 2019)	Communities (e.g., Day et al., 2009; Leong et al., 2015) Crowds (e.g., Sakurai and Chughtai, 2020; Schuetz et al., 2021) Social movements (e.g., Leong et al., 2019 ; Hacker et al., 2020) Meta-organisations (e.g., Day et al., 2009; Thapa et al., 2017; Tim et al., 2017; Mirbabaie et al., 2020; Sakurai & Chughtai, 2020)
Key information technologies	Social media platforms (e.g., Oh et al., 2015; Leong et al., 2019) Specialised platforms developed for crisis management (e.g., Dissanayake et al., 2019; Mejia et al., 2019) Specialised platforms developed for other purposes but used during crises (e.g., Mejia et al., 2019)	Social media platforms (e.g., Tim et al., 2017; Schuetz et al., 2021) Specialised platforms developed for crisis management (e.g., Corbett & Mellouli, 2017) Specialised platforms developed for other purposes but used during crises (e.g., Hacker et al., 2020)
Example goals	Converging over common goals for addressing crises (Vaast et al., 2017; Tarafdar and Kajal Ray, 2021) Managing competing goals, alternative solutions, and fighting repression (e.g., Bennett & Segerberg, 2011; Ghobadi & Clegg, 2015; Selander & Järvenpää, 2016; Tan et al., 2021)	Converging dynamics, successful disaster management, evacuation activities (e.g., Day et al., 2009; Cheng et al., 2011; Pan et al., 2012; Nan & Lu, 2014; Leong et al., 2015)

Table 4
Information technologies used in each type of self-organised collective.

Self-organised collectives	**Examples of information technologies being used**
Communities	Various forms of social media
	Green information systems
	Instant messaging
	Platform ecosystem structures
Crowds	Various forms of social media
	Medical crowdsourcing platforms
	Mobile information systems
	Crowdfunding platforms
Meta-organisations	Various forms of social media
	Web-conferencing systems
Social Movements	Various forms of social media
	E-voting systems
	Online social community sites
	E-commerce ecosystems
	Geographic information systems
	Open-source software
	Telebanking information systems
	Electronic procurement systems

organised collectives during crises should not be considered a set of features, but rather as systems of "human–machine collaborative information processing" (Oh et al., 2015, p.221).

However, researchers have not only investigated the many affordances and capabilities of IT used by self-organised collectives, but also problematised such use, highlighting the still nascent character of this type of organising and, in turn, have proposed several ways in which it can be improved. For example, while IT allows unparalleled scale and scope of collaboration within these collectives, it provides new challenges by creating a glut of sources and information that have to be filtered and sorted through in order to bring more desirable information to the fore (Cheng et al. 2011, Dissanayake et al. 2019; Jin et al. 2020, Schuetz et al. 2021). Researchers have investigated several ways in which such problems can be addressed: Cheng et al. (2011) have a novel proposal for effective information diffusion during emergencies such as H1N1 Flu outbreak on microblogging platforms; Chen et al. (2019) have identified specific linguistic practices that can help activists in generating successful online petitions; Schuetz et al. (2021) have examined potential antecedents to fact checking that can be targets for intervention to help combat fake news during pandemics; and Dissanayake et al. (2019) have developed efficient algorithms to select the most likely diagnosis to chronic conditions in medical crowdsourcing.

Collective resource-mobilisation value

We also found that the value of collective resource-mobilisation was essential, as self-organised collectives, for example, widen available talent and effective solutions not bounded by contractual agreements (Yang et al., 2015), allowing anyone who wishes to join collectives in their strategic problem-solving during crises (Leong et al., 2015; Oh et al., 2015; Leong et al., 2019). Further, in attempting to address crises, traditional actors such as government organisations and NGOs work at the limit of their capacities and often do not have time for critical activities, such as information sharing, and instead prioritise collecting information and providing

Table 5
Four dimensions across which self-organised collectives create strategic value during crises.

Key dimensions of strategic value	Details	Exemplar studies
Information sharing value	• Enabling fast and up-to-date information provision and communication channels between otherwise disconnected and heterogeneous actors • Platforms for developing shared knowledge and belief systems and knowledge re-mixing • Supports collective sense-making • Promotes resilience during crisis • Common ground for reconstituting order during uncertainty • Novel virtual modes of crisis management (without direct interactions bridging geographic and social distance)	Pan et al., 2012; Leong et al., 2015; Hacker et al., 2020; Han et al., 2020; Selander and Järvenpää, 2016; Bennett & Segerberg, 2011; Yang et al., 2015; Tim et al., 2017; Chen et al., 2019; Mirbabaie et al., 2020; Hacker et al., 2020
Collective resource-mobilisation value	• Mobilise talent, intellectual resources (e.g., information databases), and solutions not bounded by contractual agreements • Complement material and emotional resources of traditional actors • Help with collective sense-making for managing uncertainty and problem-solving • Accumulate people and material resources necessary to address crises	Day et al., 2009; Majchrzak et al., 2013; Oh et al., 2013; Yang et al., 2015; Oh et al., 2015; Leong et al., 2015; Selander & Järvenpää, 2016; Leong et al., 2019 ; Hacker et al 2020; Nguyen et al., 2021; Venkatesan et al., 2021
Network value	• Improved information collection and information sharing practices, enhanced action efforts by traditional actors • Possibility to avoid gatekeepers and contribute to diverse inclusion and exclusion paths • Bringing in individual-level contacts for finding and sharing information for the network of action during crises • Spontaneous ecosystems comprised of digital volunteers, local communities, social entrepreneurs, authorities, and information technology • Long-term potential beyond crises	Day et al., 2009; Tim et al. 2017; Dissanayake et al. 2019; Mejia et al., 2019; Han et al., 2020; Venkatesan et al., 2021
Generative value	• Exceeds the minimum necessary response to addressing the crises and creates extra value • Re-mixing and re-use of existing knowledge and reconceptualising problems based on the visions and capabilities of spontaneous actor ecosystems • Possible restricted potential and emergent, non-routine processes of value creation as a result of communication issues, lack of trust, differences in information sharing policies, and resistance from traditional actors • Possible penalising of actors contributing to developing solutions during crises	Day et al., 2009; Leong et al., 2015; Oh et al., 2015; Selander & Järvenpää, 2016; Leong et al., 2019; Han et al., 2020; Schuetz et al., 2021; Venkatesan et al., 2021

support to those affected (Day et al., 2009). In this regard, mobilisation of resources (e.g., material, emotional, intellectual) by self-organised collectives might significantly exceed (Leong et al., 2015), and importantly contribute to, efforts of traditional agencies (government and NGOs) (e.g., Day et al., 2009; Selander & Järvenpää, 2016). For example, many studies that have examined natural disasters acknowledge the critical role of volunteers in providing and distributing necessary material resources, such as shelter for hurricane victims (Day et al., 2009), and sandbags and packing materials (Leong et al., 2015). Social media affordances also play an important role in mobilising such resources (through the use of likes, signatures, visibility, and various forms of information sharing) (Ahmed & Sinnappan, 2013; Majchrzak et al., 2013; Oh et al., 2013; Oh et al., 2015; Getchell & Sellnow, 2016; Selander & Järvenpää, 2016; Hacker et al 2020; Venkatesan et al., 2021) and help with collective sense-making (Oh et al., 2015; Mirbabaie et al., 2020). In this regard, self-organised collectives do not simply use technologies of active participation during crises; rather, technology acts as an important enabler of favourable network structures (Venkatesan et al., 2021) that funnels social action (Oh et al., 2015) and accumulates people and material resources necessary to enable the collective to continue such action (Leong et al., 2019).

Other studies stress organisational, communicative, and self-organising aspects when explaining the ability of self-organised collectives to mobilise important resources during crises (Pan et al., 2012; Nan & Lu, 2014; Ghobadi & Clegg, 2015; Leong et al., 2015; Vaast et al., 2017). For example, Pan et al. (2012) illustrate that mobilisation of intellectual resources, such as information sharing, is driven by perceptions of different types of risks at different stages of crises, while Nguyen et al. (2021) discuss the value of crowdsourced warning systems to provide timely information about incoming online phishing attacks. Likewise, Nan & Lu (2014, p.1136) illustrate the importance of "organising dynamics for a large number of organisation members to self-organise online toward an orderly and rational crisis management process", while Mejia et al (2019) discuss how consumers use applications (e.g., Yelp) to create an information database about the quality of restaurants, improve restaurants' hygiene practices, and reduce the amount of restaurant-related food-borne illness which can lead to crises in the form of various 'hazards'. Another example is a study by Valecha et al (2019) which explores how emergency response involves multiple local, state, and federal communities of responders in the USA. These communities are supported by emergency dispatch agencies that share digital trace resources for task-critical information. The authors describe how the communities of responders can comprise an informal network of people and develop a structured mechanism

to show how they can mobilise resources to effectively share information.

Network value

One of the key values of self-organised collectives is that they rely on the flexible network potential of heterogenous actors to create value for addressing crises. This network value and 'flexibility' provides an opportunity for collectives to dynamically include or exclude certain actors to make the solution most effective and tailored to specific needs. This form of value is particularly important since it provides an important capability as well as enables actors involved in times of crises to dynamically adjust the scope of the actor network that is needed to mobilise and provide necessary resources and unique, tailored solutions. Therefore, crisis solutions might be developed by *inclusion paths*, whereby actors of self-organised collectives can develop initiatives to connect with already existing efforts by, for example, governments and NGOs (Day et al., 2009; Leong et al., 2015).

At the same time, it is also possible to develop crisis solutions via *exclusion paths*, whereby self-organised collectives can address crises by avoiding or purposefully excluding traditional actors (e.g., government actors, NGOs) by preventing them from acting as gatekeepers who may be filtering or blocking novel solutions (e.g., Bennett & Segerberg, 2011; Ghobadi & Clegg, 2015; Leong et al., 2015; Yang et al. 2015; Selander & Järvenpää, 2016; Chen et al., 2019). For example, Chen et al. (2019, p.105) discuss how user-generated content on Change.org allows millions of self-organised actors "to easily express their views and opinions on issues of their choosing, participate in democratic initiatives and political dialogue, and eventually create societal impacts and influence policy- and/or decision-making". Similarly, the emergence of such spontaneous ecosystems comprised of, for example, digital volunteers, local communities, social entrepreneurs, authorities, and IT is discussed as crucial for managing the consequences of natural disasters (Ahmed & Sinnappan, 2013; Thapa et al., 2017; Hong et al., 2018; Mirbabaie et al., 2020) or conflict/violent events (Jong & Dückers, 2016; Hauser et al., 2017) and for collecting information from local people and crowds using a variety of social media channels, including those that are widespread (e.g. Twitter, Instagram, Facebook) (Cheng et al., 2011; Maresh-Fuehrer & Smith, 2016; Tim et al. 2017) and more specialised (e.g. CrowdMed, other bespoke crowdsourcing platforms), that traditional actors may find difficult to gather (Dissanayake et al. 2019).

The network potential of different actors and their ability to mobilise and manage resources across multiple heterogenous actors is significantly empowered by IT (e.g., Lai et al., 2017; Valecha et al., 2019; Han et al., 2020; Venkatesan et al., 2021). Such collaboration also has a long-term potential and value, such as when traditional hygiene inspections by government and policy-makers are combined with crowd-led online initiatives to reduce potential life-threatening illnesses (Mejia et al., 2019) or when crowds offer diagnostic suggestions for health conditions that are difficult to diagnose (Dissanayake et al., 2019).

Generative value

Lastly, an interesting yet emergent topic in our analysis relates to generative value and unintended consequences of self-organised collectives during crises. We define generative value as one that exceeds the minimum necessary for survival for addressing crises and creates extra value for actors in unexpected and unanticipated ways and/or areas. For example, Leong et al. (2015) discuss how emergent communities dealing with a flooding disaster were also using the crisis situation and IT to organise new water-based recreational activities such as boat racing, snorkelling, and scuba diving. Similarly, there was a collective video created by villagers pretending to enjoy their new "water park" – their flooded village. Such activities were posted on social media and enabled participants to take a more positive perspective on the evolving crisis. Han et al., (2020) note that this type of value is enabled by a combination of organisational aspects of human actors and IT capability. In their study of crowd-led solutions to global climate change issues, they show that solutions to new problems come from re-mixing and re-use of existing knowledge as well as reconceptualisation of the problem at-hand. In a similar vein, Corbett & Mellouli (2017) explain that integrated information ecosystems can be effectively used to create additional value for sustainability and climate challenges.

At the same time, research acknowledges the complex nature of value created by self-organised collectives. Therefore, the same social media affordances that have a positive impact on collective knowledge sharing and generative value (Kaewkitipong et al., 2016) can also have unintended consequences and negative effects and lead to decreased knowledge access, sharing, or quality of actor contributions (Majchrzak et al., 2013; Abedin & Babar, 2018; Hacker et al 2020; Marabelli et al., 2021). As the mobilisation potential of self-organised collectives is not stable over time and can experience dramatic 'peaks and valleys', their ability to mobilise resources and share information can significantly exceed those of the traditional actors, or come up short (Oh et al., 2015; Leong et al., 2019, Venkatesan et al., 2021). This can lead to dramatic reversals and changes in power relations between different type of actors. For instance, Tan et al. (2021) document how novice, grassroots consumers that were kept away from many financial products and services were empowered, over time, to demand better services and increased choices in the marketplace. On the other hand, self-organised collectives' use of IT during crises can also generate negative effects over time, such as deepening a digital divide (Marabelli et al., 2021) and increasing potential penalties for participants as authorities and gatekeepers develop counteractions (Oh et al., 2015).

Finally, several studies acknowledge possible communication issues between self-organised collectives and traditional actors (e.g., government, NGOs), as resistance from the latter may limit the credibility of the former and thus their potential to bring about real change. This can be detrimental to generative value. For example, Selander & Järvenpää (2016) report on a lack of trust from traditional actors, given their reservations about the crowd's adherence to their values, and political impacts of online petitions by the members of the social movement organisation, Amnesty International. Similarly, Day et al. (2009) report that NGOs such as the Red Cross found it problematic to share data on victims with volunteers, who would then resort to personal networks to find information. Thus, trust in traditional actors may be lacking, presenting unique challenges to collective organising and the fulfilment of generative

value.

Theorising the strategic value of IT-enabled self-organised collectives during crises

Our findings have revealed four types of value generated by self-organised collectives during crises, namely: (i) information sharing value; (ii) collective resource-mobilisation value; (iii) network value; and (iv) generative value. Based on our findings, we develop a model showing the strategic value of IT-enabled self-organised collectives during crises (see Fig. 1).

As Fig. 1 illustrates, we theorise that self-organised collectives also develop capabilities that enable them to create strategic value across the four key dimensions. We summarise these capabilities further in Table 6 and discuss each in more detail. The first such capability, information sharing capabilities, is derived from information sharing value as a key dimension identified in our work. Specifically, in many of the reviewed papers we observed that information sharing was taking place via emergent communication channels. This enabled sense-making that was co-created by an extended variety of actors (i.e., crowds, communities). Overall, knowledge flows amongst heterogeneous actors enabled resilience, thus reconstituting order in times of crisis and uncertainty, whilst demonstrating novel virtual modes of crisis management.

Second, we recognised the prevalence of collective resource-mobilisation value in our reviewed papers and realised that the strategic value of self-organised collectives also comes in the form of their collective mobilisation capabilities. Particularly important here was access to new resources and capabilities not available for traditional actors (i.e., with hierarchical reporting structures, centralisation, increased bureaucracy leading to slower responses). Collective resource-mobilisation and the resulting capabilities also allow remote interactions and crisis contributions beyond geographical and social distances which may restrict traditional actors. Overall, this capability helps with collective sense-making for managing uncertainty and problem-solving and accumulates people and material resources necessary to address crises.

Third, the dimension of network value demonstrates the role of tailored network capabilities by self-organised collectives. By this, we posit that this capability and its resources are tailored to the crisis at-hand and driven by the needs of actors 'on the ground'. Moreover, there is the possibility to include and exclude actors and this provides dynamic scope for the networked actors involved in addressing crisis situations in the long term, with 'spontaneous' ecosystems comprised of digital volunteers, local communities, social entrepreneurs, authorities, and different types of IT.

Lastly, generative value was an emergent theme of interest in our reviewed papers, and this shows the potential for generative value capabilities that arise as self-organised collectives address crises. Generative value addresses crises but also demonstrates cases of exceeding the necessary crises situation and creating extra value for actors (e.g., recreational water park activities developed by communities affected by flooding) (Leong et al., 2015). There is again evidence of knowledge re-mixing and re-use of existing knowledge here, and reconceptualisation of problems based on the visions and capabilities of spontaneous actor ecosystems. However, there is also the possibility of restricted potential to generative value creation because of communication issues, lack of trust,

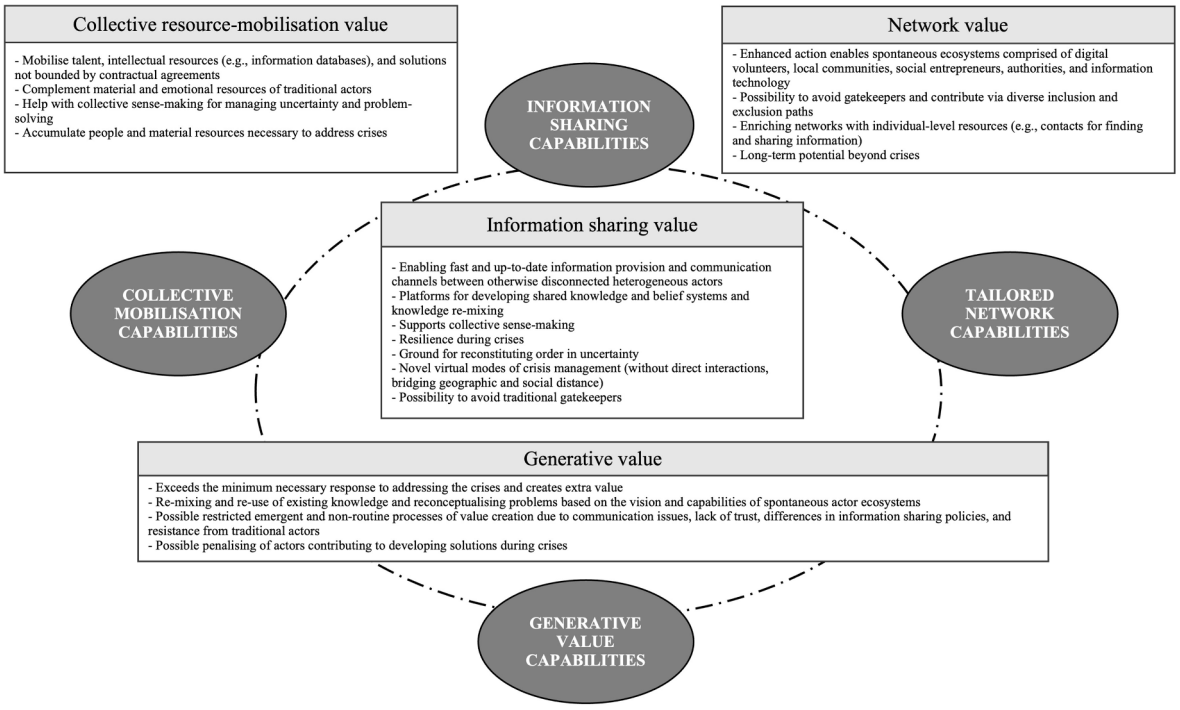

Fig. 1. Model showing the strategic value and capabilities of IT-enabled self-organised collectives during crises.

Table 6
Dimensions of strategic value and the distinctive capabilities of self-organised collectives.

Dimensions of strategic value	Capabilities of self-organised collectives
Information sharing value	**INFORMATION SHARING CAPABILITIES**
	• Information sharing via emergent communication channels • Sense-making co-created by extended variety of actors • Knowledge re-mixing and flows of heterogeneous actors
Collective resource-mobilisation value	**COLLECTIVE MOBILISATION CAPABILITIES**
	• Access to new resources and capabilities not available to traditional actors • Remote interactions and contributions to crises beyond geographical and social distances
Network value	**TAILORED NETWORK CAPABILITIES**
	• Possibility to include and exclude provides dynamic scope of networked actors • Capabilities and resources tailored to the problem and driven by specific needs during crises
Generative value	**GENERATIVE VALUE CAPABILITIES**
	• Generative value exceeding the necessary survival or addressing of crises, and creating extra value for actors • Value evolving over time

differences in information sharing policies, and resistance from traditional actors.

Theoretical and practical implications

Having unpacked our insights about the strategic value of self-organised collectives during crises, our study makes several notable contributions. First and foremost, we contribute to research on crisis management by illustrating that self-organised collectives are important actors that play a significant role in managing diverse crisis contexts (including various natural and social/human-made crises). We show how self-organised collectives provide new pathways to addressing crises by developing a model to show their strategic value through the development of specific capabilities which are paramount for understanding their potential role and behaviour. Second, we specify four key types of self-organised collectives (communities, crowds, social movements, and meta-organisations) during crises and the types of IT they use. Previous studies have generated insightful accounts about the value of particular forms of self-organised collectives (e.g., Leong et al., 2015; Oh et al., 2015; Selander & Järvenpää, 2016; Mejia et al., 2019). Our study builds on, and further expands these insights by highlighting several important types of strategic value and capabilities that are shared by the collectives across diverse crisis contexts. This provides an opportunity to bridge previously unconnected streams of research and develop a shared knowledge about the value of types of self-organised collectives during crises as a coherent emergent phenomenon worthy of further investigation.

Third, our findings reveal that self-organised collectives are qualitatively different actors in the way they rely on emergent and dynamic organising, decentralised knowledge-sharing, and extended collective sense-making during crises. As the identified dimensions of strategic value in this work specify (see Fig. 1 and Table 6), collectives develop and practice a unique combination of capabilities. Such capabilities are important since they enable strategic value in areas and in ways beyond those that are the focus of traditional actors and centralised organisations. Finally, our findings illustrate that the strategic value of self-organised collectives has two specificities. First, it can be highly volatile in terms of actor contributions and generated solutions (changing value over time, potential for unintended effects). Second, the strategic value of self-organised collectives is enabled by a configuration of enabling and restricting technology affordances, which makes IT not only an enabler of self-organised collectives but also a shaping actor in what value is generated, accumulated, and provided by the self-organised collectives.

Whilst our main focus in this paper is to unpack implications for theory, our findings also offer two implications for practitioners and policy-makers involved in crisis situations. First, our analysis reveals the varied and significant potential of self-organised collectives to create value during crises, which suggests that professionals and policy-makers need to take their role and their strategic importance seriously. Second, our study reveals several important aspects that could prevent traditional organisations dealing with crises (e.g., governments, security forces, NGOs) and thus emphasises and captures the value of self-organised collectives in such situations. As summarised in our findings and discussion, these aspects include miscommunication problems (especially those related to restrictive and bureaucratic policies of data collection and sharing), resistance from traditional actors, differing values, and competing goals. The latter, in particular, might result in a range of negative and unproductive results during crises, ranging from limited possibilities for self-organised collectives to create a real-impact, to repression of the participants of the self-organised collectives responding to crises.

Research agenda

In developing our research agenda, our intention is to outline prescriptive recommendations for future research to encourage theory building (Rivard, 2021). Here, we express our reflections around four emerging areas that we recognised in the literature and which we believe are particularly fruitful in advancing research into the strategic role and value of self-organised collectives during

crises. These are organised in Table 7 by the emerging area, the rationale for future research that we have derived from extant work, and a summary of example future research questions. Overall, this agenda is illustrative and is a brief starting point for researchers to consider avenues to build on our review and outlined dimensions and begin theorising more about the strategic value of self-organised collectives during crises.

The first area outlines the need to consider IT in self-organised collectives as complex human–machine systems. Specifically, we recognise that many studies focus on specific IT features enabling collective action of the actors (e.g., in communities, social movements) to self-organise. However, there is also an emergent trend and evidence suggesting that value of self-organised collective action is shaped by both technology structure (e.g., features, connections) and actors' emergent uses (selective and alternative uses, negative impacts of affordances). This considered, there is scope to explore specificities of technology structure further, particularly by going beyond the affordances of technology and understanding what configurations of IT features and types of emergent uses by self-organised collectives are effective across different types of crises, or by exploring what configurations of collectives and traditional actors and IT types are most effective during crises.

The second area emphasises the fragility and changing dynamics of value. Namely, we contend that whilst there is focus on the value of self-organised collectives to address a particular time-bounded crisis, there is also increasing recognition that such value is highly dynamic for the actors (e.g., high variations of social action during crises) and can also become more fragile over time. Therefore, future work should study the changing value and potential of self-organised collectives across time. This could be accomplished by, for example, examining which dynamics of value creation are most typical for certain types of self-organised actors longitudinally, or by exploring how such dynamics can be leveraged for most effective crisis solutions.

A third area for further research concerns the potential enabling and restrictive impacts of context on self-organised collectives. Whilst our review reveals similar characteristics of key actors and IT in self-organised collectives that develop for addressing natural and social/human-made crises (see Table 3), these two types of context might have distinctive impacts on the value potential of self-organised collectives over time. For instance, while actors in the context of natural disasters seem to have the same (or similar) goals (e.g., successful disaster management), social/human-made crises enable both a convergence path whereby heterogeneous actors unite under a common goal and a divergence path where actors use the crisis to emphasise and leverage competing goals and solutions (e.g., Vaast et al., 2017; Tarafdar and Kajal Ray, 2021). Cases in point are the dramatic reversal of power relations in the Chinese fintech market as grassroots consumers were empowered and demanded more services, and supported competition (Tan et al. 2021), in examples showing the decline and erosion of online activism (e.g., Bennett & Segerberg, 2011; Ghobadi & Clegg, 2015), and in cases of e-voting systems that were successfully adopted in newer democracies and faced opposition in established democracies (Avgerou, 2013). This also highlights the importance of the process view for the study of self-organised collectives and their evolution, and consideration of social, historical, institutional, and cultural conditions that shape how value is generated by self-organised collectives that address social/human-made crises. Finally, further research can provide useful analysis of the impacts of more fine-grained internal contextual factors, such as trust, on the value and capabilities of self-organised collectives.

Lastly, we outline an area to encourage better understanding of distinctive resource and network capabilities of self-organised collectives during crises. There is evidence for the potential of self-organised collective actors to mobilise (include and exclude) resources and networks of actors differently. Therefore, there is much scope for researchers to consider the value of self-organised collectives for not only including certain actors but also for excluding certain actors (e.g., those who are too 'slow', bureaucratic, or corrupt). Furthermore, future research should focus not only on mobilising resources but also on the de-channelling of unnecessary resources (e.g., systems that are slow, or not fit for purpose) or routines.

Conclusion

Our work has three contributions. First, we have illustrated the importance of IT-enabled self-organised collectives and their role in times of crisis by conducting a comprehensive review of this phenomena. Specifically, we have identified four overarching dimensions which signal the strategic value that such collectives create during crises. Second, we have applied our findings to a formalised model which has theoretical and practical implications. Third, this provides a platform for us to discuss the state of knowledge in relation to self-organised collectives during crises and to develop an illustrative research agenda that we hope will be a driver for more empirical and conceptual research.

It is also important to recognise that our work has some limitations. For instance, whilst we took steps to ensure a rigorous theorising review (Leidner, 2018), such analyses, and the steps taken, are subjective. Going forward, the work and the developed model, or similar work that builds on our review, could be further validated through discussions with stakeholders (e.g., collective actors involved during crises). Second, our review is intentionally narrowed to address a very specific phenomenon and in a select range of journals, and we therefore recognise that there is a body of relevant and interesting work in the wider literature and in other fields that are not included in this paper. Broadening the focus might be a fruitful avenue for future research (e.g., the role of self-organised collectives in other situations, or in a wider body of journals); however, our boundaries for selected literature were sufficiently narrow to allow us to maintain our focus. Third, we acknowledge that the role of collectives during crises is a burgeoning topic and that the field will continue to expand beyond the small number of papers that we have identified as relevant here, and that research applicable to our devised agenda will already be well underway. This is a snapshot of what is no doubt going to be a growing area and a platform for other researchers (as signalled with our theorising and research agenda) to begin understanding self-organised collectives during crises. Overall, we hope our work proves to be a valuable resource and provides a foundation to advance research in this area.

Table 7
Research agenda for future research on IT-enabled self-organised collectives during crises.

Areas for future research	Rationale derived from the reviewed literature	Questions for future research
Information technology as complex human–machine systems enabling self-organised collectives during crises.	Literature suggests an important value dimension of self-organised collectives during crises is shaped by both technology structure (e.g., features, connections) and actors' emergent 'uses' (selective and alternative uses, negative impacts of affordances).	- What IT features, affordances, or their combinations facilitate and impede self-organised collectives' networking with unintended and traditional actors? - What configurations of IT features and types of emergent uses by self-organised collectives are effectives across different types of crises (e.g., natural disasters, social/human-made crises)? - What configurations of collective and traditional actors and IT types are most effective in different types of crises?
Fragility and dynamic nature of value of self-organised collectives during crises.	While there is focus on the value of IT-enabled self-organised collectives to address a particular time-bounded crisis, there is increasing acknowledgement that such value is highly dynamic for actors and is fragile over time (e.g., it can be used against the participants) and is driven by competing goals.	- How does the value and potential of self-organised collectives evolve over time? - What dynamics of value creation is most typical for certain types of self-organised actors (e.g., crowds, social movements, communities, meta-organisations) in short- and long-term phases? - How can these dynamics be leveraged for the most effective solutions during crises? - What IT/IT features, or practices, can help preserve self-organised collectives as they regress or become objects of attacks from traditional gatekeepers and authorities (e.g., government attacks on activists)?
Enabling and restrictive impacts of context on self-organised collectives during crises.	The type of context during crises (i.e., natural vs social/human-made) might have distinctive impacts on the value potential of self-organised collectives over time and in the process of their evolution.	- Why and how do actors in different crisis contexts tend to have the same (or similar), or differing, goals? - What roles do social, historical, institutional, and cultural conditions have in shaping how value is generated by self-organised collectives in different crisis contexts? - What is the impact of internal contextual factors, such as trust, on the value and capabilities of self-organised collectives?
Distinctive resource and network capabilities of self-organised collectives during crises.	Emergent evidence about an extended potential of self-organised collective actors to strategically adjust (include and exclude) resources and networks of actors based on the evolving needs during crises.	- What value of self-organised collectives is created when certain actors get included or excluded during crises (e.g., traditionally too slow, bureaucratic, or corrupt)? - How do self-organised collectives both mobilise important limited resources but also de-channel unnecessary resources during crises (e.g., slow working systems)?

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Appendix

Journals Selected for Review and Search Terms

AIS Senior Scholars' Basket of Eight Journals Information Systems Journals: European Journal of Information Systems; Information Systems Journal; Information Systems Research; Journal of Information Technology; Journal of Management Information Systems; Journal of Strategic Information Systems; Journal of the Association for Information Systems; MIS Quarterly.

Additional Information Systems Journals: Communications of the Association for Information Systems; Computers in Human Behavior; Decision Support Systems; Information & Organization; Information, Communication & Society; Information Systems Frontiers; International Journal of Information Management; Pacific Asia Journal of the Association for Information Systems.

Note: for papers which were in journals outside of the AIS 'Basket of Eight', we checked their ranking to ensure they featured on the CABS academic journal guide (UK) as a widely used benchmark of research quality. We conducted our review before the update to the AIS 'Basket of Eight' list which later became the 'Senior Scholars' List of Premier Journals'. The updated list includes journals that we have listed as additional information systems journals.

Example search terms	Publication period	Initial totals
"Community AND crisis AND disaster"	2001–2022 (all possible outlined journals)	103
"Crowd AND crisis AND disaster"		68
"Social movements AND crisis AND disaster"		49
"Networks AND Meta-organisations AND crisis AND disaster"		11
		Overall total: 231

References

Abedin, B., Babar, A., 2018. Institutional vs. Non-Institutional Use of Social Media During Emergency Response: A Case of Twitter in 2014 Australian Bush Fire. Inf. Syst. Front. 20 (4), 729–740.

Ahmed, A., Sinnappan, S., 2013. The Role of Social Media During Queensland Floods: An Empirical Investigation on the Existence of Multiple Communities of Practice (MCoPs). Pacific Asia J. Assoc. Inform. Syst. 1–22.

Avgerou, C., 2013. Explaining Trust in IT-Mediated Elections: A Case Study of E-Voting in Brazil. J. Assoc. Inf. Syst. 14 (8), 420–451.

Benkler, Y., 2017. Peer production, the commons, and the future of the firm. Strateg. Organ. 15 (2), 264–274.

Bennett, W.L., Segerberg, A., 2011. Digital Media and the Personalization of Collective Action: Social Technology and the Organization of Protests Against the Global Economic Crisis. Inf. Commun. Soc. 14 (6), 770–799.

Brengarth, L.B., Mujkic, E., 2016. Web 2.0: How Social Media Applications Leverage Nonprofit Responses During a Wildfire Crisis. Comput. Hum. Behav. 54, 589–596.

Chen, Y., Deng, S., Kwak, D.H., Elnoshokaty, A., Wu, J., 2019. A multi-appeal model of persuasion for online petition success: A linguistic cue-based approach. J. Assoc. Inf. Syst. 20 (2), 105–131.

Cheng, J., Sun, A., Hu, D., Zeng, D., 2011. An Information Diffusion-Based Recommendation Framework for Micro-Blogging. J. Assoc. Inf. Syst. 12 (7).

Corbett, J., Mellouli, S., 2017. Winning the SDG battle in cities: how an integrated information ecosystem can contribute to the achievement of the 2030 sustainable development goals. Inf. Syst. J. 27 (4), 427–461.

Day, J.M., Junglas, I., Silva, L., 2009. Information flow impediments in disaster relief supply chains. J. Assoc. Inf. Syst. 10 (8).

Dissanayake, I., Nerur, S., Singh, R., Lee, Y., 2019. Medical Crowdsourcing: Harnessing the "Wisdom of the Crowd" to Solve Medical Mysteries. J. Assoc. Inf. Syst. 20 (11), 1589–1610.

Eismann, K., Posegga, O., Fischbach, K., 2021. Opening organizational learning in crisis management: On the affordances of social media. J. Strateg. Inf. Syst. 14 (4), 101692.

Falkheimer, J., Heide, M., 2006. Multicultural Crisis Communication: Towards a Social Constructionist Perspective. J. Conting. Crisis Manag. 14 (4), 180–189.

Faraj, S., von Krogh, G., Monteiro, E., Lakhani, K.R., 2016. Special section introduction—Online community as space for knowledge flows. Inf. Syst. Res. 27 (4), 668–684.

Getchell, M.C., Sellnow, T.L., 2016. A Network Analysis of Official Twitter Accounts During the West Virginia Water Crisis. Comput. Hum. Behav. 54, 597–606.

Ghobadi, S., Clegg, S., 2015. "These days will never be forgotten": A critical mass approach to online activism. Inf. Organ. 25 (1), 52–71.

Gioia, D.A., Corley, K.G., Hamilton, A.L., 2013. Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. Organisational Research Methods 16, 15–31.

Gulati, R., Puranam, P., Tushman, M., 2012. Meta-Organizational Design: Rethinking Design in Inter-Organizational and Community Contexts. Strateg. Manag. J. 33 (6), 571–586.

Hacker, J., vom Brocke, J., Handali, J., Otto, M., Schneider, J., 2020. Virtually in this together – how web-conferencing systems enabled a new virtual togetherness during the COVID-19 crisis. Eur. J. Inf. Syst. 29 (5), 563–584.

Hale, J., 2015. A Layered Communication Architecture for the Support of Crisis Response. J. Manag. Inf. Syst. 14 (1), 235–255.

Han, Y., Ozturk, P., Nickerson, J.V., 2020. Leveraging the Wisdom of the Crowd to Address Societal Challenges: Revisiting the Knowledge Reuse for Innovation Process through Analytics. J. Assoc. Inf. Syst. 21 (5), 1128–1152.

Hauser, F., Hautz, J., Hutter, K., Füller, J., 2017. Firestorms: Modeling Conflict Diffusion and Management Strategies in Online Communities. J. Strateg. Inf. Syst. 26 (4), 285–321.

Hong, L., Fu, C., Wu, J., Frias-Martinez, V., 2018. Information Needs and Communication Gaps Between Citizens and Local Governments Online During Natural Disasters. Inf. Syst. Front. 20 (5), 1027–1039.

Housel, T.J., El Sawy, O.A., Donovan, P.F., 1986. Information Systems for Crisis Management: Lessons from Southern California Edison. MIS Q. 10 (4), 389–400.

Jin, Y., Ding, C., Cheng, H.K., 2020. Click to Success? The Temporal Effects of Facebook Likes on Crowdfunding. J. Assoc. Inf. Syst. 21 (5), 1191–1213.

Jong, W., Dückers, M.L.A., 2016. Self-Correcting Mechanisms and Echo-Effects in Social Media: An Analysis of the "Gunman in the Newsroom" Crisis. Comput. Hum. Behav. 59, 334–341.

Kaewkitipong, L., Chen, C.C., Ractham, P., 2016. A Community-Based Approach to Sharing Knowledge Before, During, and After Crisis Events: A Case Study From Thailand. Comput. Hum. Behav. 54, 653–666.

Kim, J., Bae, J., Hastak, M., 2018. Emergency Information Diffusion on Online Social Media During Storm Cindy in U.S. Int. J. Inf. Manag. 40, 153–165.

Lai, C.-H., She, B., Tao, C.-C., 2017. Connecting the Dots: A Longitudinal Observation of Relief Organizations' Representational Networks on Social Media. Comput. Hum. Behav. 74, 224–234.

Leidner, D.E., 2018. Review and theory symbiosis: An introspective retrospective. J. Assoc. Inf. Syst. 19 (6), 552–567.

Leidner, D.E., Pan, G., Pan, S.L., 2009. The role of IT in crisis response: Lessons from the SARS and Asian Tsunami disasters. J. Strateg. Inf. Syst. 18 (1), 80–99.

Leonardi, P., 2013. When Does Technology Use Enable Network Change in Organizations? A Comparative Study of Feature Use and Shared Affordances. MIS Q. 37 (3), 749–775.

Leonardi, P., 2014. Social Media, Knowledge Sharing, and Innovation: Toward a Theory of Communication Visibility. Inf. Syst. Res. 25 (4), 796–816.

Leong, C., Pan, S.L., Bahri, S., Fauzi, A., 2019. Social media empowerment in social movements: power activation and power accrual in digital activism. Eur. J. Inf. Syst. 28 (2), 173–204.

Leong, C.M.L., Pan, S.L., Ractham, P., Kaewkitipong, L., 2015. ICT-Enabled Community Empowerment in Crisis Response: Social Media in Thailand Flooding 2011. J. Assoc. Inf. Syst. 16 (3), 174–212.

Lin, X., Spence, P.R., Sellnow, T.L., Lachlan, K.A., 2016. Crisis Communication, Learning and Responding: Best Practices in Social Media. Comput. Hum. Behav. 65, 601–605.

Majchrzak, A., Malhotra, A., 2020. *Unleashing the Crowd*. Palgrave Macmillan, Cham, Switzerland.

Majchrzak, A., Järvenpää, S.L., Hollingshead, A.B., 2007. Coordinating Expertise Among Emergent Groups Responding to Disasters. Organ. Sci. 18 (1), 147–161.

Majchrzak, A., Faraj, S., Kane, G.C., Azad, B., 2013. The Contradictory Influence of Social Media Affordances on Online Communal Knowledge Sharing. J. Comput.-Mediat. Commun. 19 (1), 38–55.

Marabelli, M., Vaast, E., Li, J.L., 2021. Preventing the digital scars of COVID-19. Eur. J. Inf. Syst. 30 (2), 176–192.

Maresh-Fuehrer, M.M., Smith, R., 2016. Social Media Mapping Innovations for Crisis Prevention, Response, and Evaluation. Comput. Hum. Behav. 54, 620–629.

Mejia, J., Mankag, S., Gopal, A., 2019. A for Effort? Using the Crowd to Identify Moral Hazard in New York City Restaurant Hygiene Inspections. Inf. Syst. Res. 30 (4), 1107–1452.
Miles, M.B., Huberman, A.M., 1994. Qualitative data analysis: An expanded sourcebook. Sage Publications, New York.
Mirbabaie, M., Bunker, D., Stieglitz, S., Marx, J., Ehnis, C., 2020. Social media in times of crisis: Learning from Hurricane Harvey for the coronavirus disease 2019 pandemic response. J. Inf. Technol. 35 (3), 195–213.
Nan, N., Lu, Y., 2014. Harnessing the power of self-organization in an online community during organizational crisis. MIS Q. 38 (4), 1135–1158.
Nguyen, C., Jensen, M.L., Durcikova, A., Wright, R.T., 2021. A comparison of features in a crowdsourced phishing warning system. Inf. Syst. J. 31 (3), 473–513.
Oh, O., Agrawal, M., Rao, H.R., 2011. Information Control and Terrorism: Tracking the Mumbai Terrorist Attack Through Twitter. Inf. Syst. Front. 13 (1), 33–43.
Oh, O., Agrawal, M., Rao, H.R., 2013. Community Intelligence and Social Media Services: A Rumor Theoretic Analysis of Tweets during Social Crises. MIS Q. 37 (2), 407–426.
Oh, O., Eom, C., Rao, H.R., 2015. Role of Social Media in Social Change: An Analysis of Collective Sense Making During the 2011 Egypt Revolution. Inf. Syst. Res. 26 (1), 210–223.
Okoli, C., 2015. A Guide to Conducting a Standalone Systematic Literature Review. Commun. Assoc. Inf. Syst. 37 (1).
Pan, S.L., Pan, G., Leidner, D.E., 2012. Crisis Response Information Networks. J. Assoc. Inf. Syst. 12 (1), 31–56.
Poblet, M., García-Cuesta, E., Casanovas, P., 2018. Crowdsourcing Roles, Methods, and Tools for Data-Intensive Disaster Management. Inf. Syst. Front. 20 (6), 1363–1379.
Puranam, P., Alexy, O., Reitzig, M., 2014. What's "New" About New Forms of Organizing? Acad. Manag. Rev. 39 (2), 162–180.
Richardson, B., 1994. Crisis Management and Management Strategy-Time to "Loop the Loop"? Disaster Prev Manag 3 (3), 59–80.
Rivard, S., 2021. Theory building is neither an art nor a science. It is a craft. J. Inf. Technol. 36 (3), 316–328.
Sakurai, M., Chughtai, H., 2020. Resilience against crises: COVID-19 and lessons from natural disasters. Eur. J. Inf. Syst. 29 (5), 585–594.
Schuetz, S.W., Sykes, T.A., Venkatesh, V., 2021. Combating COVID-19 Fake News on Social Media through Fact Checking: Antecedents and Consequences. Eur. J. Inf. Syst. 30 (4), 376–388.
Seeger, M.W., Sellnow, T.L., Ulmer, R.R., 1998. Communication, Organization, and Crisis. Ann. Int. Commun. Assoc. 21 (1), 231–276.
Selander, L., Järvenpää, S.L., 2016. Digital action repertoires and transforming a social movement organization. MIS Q. 40 (2), 331–352.
Stewart, M., Schultze, U., 2019. Producing solidarity in social media activism: The case of My Stealthy Freedom. Inf. Organ. 29 (3), 100251.
Suddaby, R., 2010. Editor's Comments: Construct Clarity in Theories of Management and Organization. Acad. Manag. Rev. 35 (3), 346–357.
Takahashi, B., Tandoc, E.C., Carmichael, C., 2015. Communicating on Twitter During a Disaster: An Analysis of Tweets During Typhoon Haiyan in the Philippines. Comput. Hum. Behav. 50, 392–398.
Tan, T., Zhang, Y., Heng, C.S., Ge, C., 2021. Empowerment of Grassroots Consumers: A Revelatory Case of a Chinese Fintech Innovation. J. Assoc. Inf. Syst. 22 (1), 179–203.
Tarafdar, M., Kajal Ray, D., 2021. Role of social media in social protest cycles: A sociomaterial examination. Inf. Syst. Res. 32 (3), 1066–1090.
Thapa, D., Budhathoki, N.R., Munkvold, B.E., 2017. Analyzing Crisis Response through Actor-network Theory: The Case of Kathmandu Living Labs. Commun. Assoc. Inf. Syst. 41 (1).
Tim, Y., Pan, S.L., Ractham, P., Kaewkitipong, L., 2017. Digitally enabled disaster response: the emergence of social media as boundary objects in a flooding disaster. Inf. Syst. J. 27 (2), 197–232.
Vaast, E., Safadi, H., Lapointe, L., Negoita, B., 2017. Social media affordances for connective action - an examination of microblogging use during the Gulf of Mexico oil spill. MIS Q. 41 (4), 1179–1205.
Valecha, R., Rao, H.R., Upadhyaya, S.J., Sharman, R., 2019. An Activity Theory Approach to Modeling Dispatch-Mediated Emergency Response. J. Assoc. Inf. Syst. 20 (1), 33–57.
Venkatesan, S., Valecha, R., Yaraghi, N., Oh, O., Rao, H.R., 2021. Influence in Social Media: An Investigation of Tweets Spanning the 2011 Egyptian Revolution. MIS Q. 45 (4), 1679–1714.
Yang, X., Tong, Y., Teo, H.H., 2015. Fostering fast-response spontaneous virtual team: Effects of member skill awareness and shared governance on team cohesion and outcomes. J. Assoc. Inf. Syst. 16 (11), 919–946.
Yates, D., Paquette, S., 2011. Emergency Knowledge Management and Social Media Technologies: A Case Study of the 2010 Haitian Earthquake. Int. J. Inf. Manag. 31 (1), 6–13.
Zorina, A., 2021. Overcoming resource challenges in peer-production communities through bricolage: The case of HomeNets. Inf. Organ. 31 (3).