

Article

#StrongTogether? Qualitative Sentiment Analysis of Social Media Reactions to Disaster Volunteering during a Forest Fire in Finland

Harri Raisio ^{1,*} , Alisa Puustinen ² and Juha Lindell ¹¹ School of Management, University of Vaasa, 65101 Vaasa, Finland; juha.lindell@uwasa.fi² Emergency Services Academy Finland, 70821 Kuopio, Finland; alisa.puustinen@pelastusopisto.fi

* Correspondence: harri.raisio@uwasa.fi

Abstract: The transformation of disaster volunteering has been highlighted in academic literature. This study examined that transformation via a big data approach. The context for the study was provided by a forest fire in Finland, which sparked a debate on volunteering. The data (806 social media messages) were analyzed using qualitative sentiment analysis to (1) identify the sentiments relating to a variety of volunteers and (2) understand the context of and tensions behind those sentiments. The data suggested that the prevailing view of disaster volunteering is a rather traditional one, while the observations on the transformation remain largely latent. The positive sentiments reflected a view of the co-production of extinguishing forest fires as an activity of formal governmental and nonprofit emergency management organizations and volunteers from expanding and extending organizations. Unaffiliated volunteers were seen as extra pairs of hands that could be invited to help in an organized way and with limited tasks, only if required. Sentiments with a more negative tone raised concerns about having sufficient numbers of affiliated volunteers in the future and the rhetorical level of appreciation of them. The data revealed a dichotomous relationship between “professionals” and “amateurs” and the politicization of the debate between different actor groups.

Keywords: disaster volunteering; forest fire; climate change; spontaneous volunteering; involvement/exclusion paradox; co-production; qualitative sentiment analysis



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1. Introduction

McLennan et al. [1] noted how the landscape of volunteering has been transforming throughout the twenty-first century. The transformation has been driven by factors such as the diversification of ways of volunteering, especially with regard to the growing significance of spontaneous or episodic volunteering, and the technological upheaval, that is, the advances made in information and communications technologies [2,3]. However, this transformation is not only about volunteering at a general level but is also evident in disaster volunteering [4–6].

The transformation of disaster volunteering has increasingly been explored in recent years. While some studies have focused on exploring how traditional disaster volunteering could be sustained [7–9], other studies have sought to develop ways in which spontaneous volunteers could be best utilized in a crisis [10–13]. Researchers have surveyed various societal actors to harvest views on the developments [5,14]. However, such views have not been previously collected by employing big data approaches, which ideally could shed light on this ongoing transformation.

In the summer of 2021, Finland faced one of its worst forest fires. In Finnish terms, the Kalajoki forest fire attracted an exceptional amount of attention on social media and especially in connection with volunteering. While the forest fire that burned 227 hectares was a highly undesirable event, it provided an opportunity to advance the understanding of the transformation in disaster volunteering through big data analysis. There were three

main reasons perceived for the volume of social media attention on volunteering. First, the chief executive officer of the regional rescue services tweeted about the forest fire numerous times every day and frequently commented on the role of volunteers. Second, a large number of contract fire brigades took to social media to highlight their own role and participation. In the Finnish context, contract fire brigades can be defined as “volunteer brigades that have a contract with a regional rescue authority for their services” [7] (p. 619). Third, a discourse emerged on social media over who should be offering assistance to the governmental or nonprofit emergency management organizations addressing the ongoing disaster. This sometimes ideologically intensive debate also nurtured a more general level perception of the role of unaffiliated volunteers in addressing disasters.

This article was informed by data collected from various social media platforms using the Mohawk Analytics search engine. The initial sample comprised 6452 social media messages. After four stages of data filtering, a total of 806 relevant social media messages remained. The data were analyzed using qualitative sentiment analysis [15] with the aim of (1) identifying the sentiments of a selection of volunteers and (2) understanding the context and tensions behind these sentiments.

Climate change served as a higher-level contextual factor in this article. The literature has highlighted how climate change affects the number, scale, and complexity of disasters, and how governmental or nonprofit emergency management organizations alone cannot respond to these disasters [16,17]. Consequently, it has been emphasized that coping with future disasters will require a wide range of societal actors, including various types of volunteers [17,18]. The changing demands triggered by responses to climate change emergencies also have implications for research. As Grant and Langer [19] stated, considering “climate change, changing demographics, and the increased demands on fire services more generally, there is an urgent need to better understand the significance of volunteers in emergency management”.

The article is structured as follows. The article begins with a review of literature related to volunteerism in disasters. This section pays particular attention to the growing body of literature related to spontaneous volunteers and emergent citizen groups. Thereafter, the data and methods are described in more detail before the study analyzes the extracted big data on disaster volunteering. Finally, a discussion section binds these results to the article’s theoretical framework, and the conclusion section highlights the limitations of the study and outlines potential research questions.

2. Volunteerism in Disasters

2.1. Typology of Disaster Volunteerism

Probably the best-known typology related to disaster volunteering is the Disaster Research Center (DRC) typology of organized behavior [20]. This typology includes four types of organized response to disasters distinguished by tasks (regular and non-regular) and structures (old or new). In DRC typology, volunteering applies to all the four types, that is, established (type I), expanding (type II), extending (type III), and emergent organizations (type IV) [21].

Established organizations are identified by their undertaking regular tasks with old structures [2,10,20]. Examples are traditional response organizations such as the police and fire and rescue services. As Strandh and Eklund [21] stated, although volunteering is most evident in the other types included in DRC typology, it also emerges in these type I organizations. Strandh and Eklund [21] used fire brigades as an example of established organizations underpinned by a volunteer base, in this case, volunteer and contract fire brigades. It could also be argued that volunteers in these type I organizations are *anticipated organization volunteers* [22] or *affiliated volunteers* [4]. It is known that such volunteers—who have received training in assisting with disaster situations—are involved, and their participation is factored into contingency plans. Such organized volunteers work in *voluntary emergency organizations* which have “emergency response as part of their core activities” and who “exist, at least partly, to assist professional responders when an emergency occurs,

and many of them are part of the official national system of civil protection and preparedness" [23] (p. 521). It must be also noted here that the role of contract fire brigades as part of the fire and rescue services in Finland is quite official, formal, and recognized. It can even be argued that they are more like a part of the public service system than true volunteers (see also [7,24]). This issue is also addressed in the result section of the article.

Expanding organizations are identified by their undertaking regular tasks while adopting new structures [2,20,21]. An oft-used example is the Red Cross, which is capable of mobilizing a large number of volunteers in the event of a disaster. These volunteers are then not involved in the organization's normal activities, i.e., "expanding organizations for the most part exist on paper before disaster strikes" [10] (p. 339). Moreover, Whittaker et al. [2] (p. 359) pointed out that expanding organizations (such as the Salvation Army) typically carry out "core activities that are non-emergency related but have latent emergency function". A key difference between type I and II organizations is that in established organizations, affiliated volunteers are involved in day-to-day activities (e.g., volunteer and contract firefighters) while in expanding organizations, volunteers are only invited to the scene in the event of a major disaster. However, the line between these organizational categories is not entirely unambiguous. For example, it is a moot point whether the female units of volunteer fire brigades serve in this kind of expanding organizational role or more closely resemble the traditional form of established volunteering.

Extending organizations are identified by their undertaking new tasks while retaining old structures [2,20]. Examples of such actors are private sector organizations that volunteer to assist in disaster situations. The research literature highlights, among other parties, supermarkets that provide food, farmers who deploy agricultural equipment to fight forest fires, and construction companies who clear debris during search and rescue operations [21,23,25]. Voluntary organizations might also act as extending organizations, with an example being a traditional community association which contributes to disaster management as required [26]. Such extending organizations then operate outside their traditional role and often have limited disaster response experience.

Emergent organizations are identified by their undertaking new tasks while adopting new structures [2,20]. This type IV organization includes both group-level actors (i.e., emergent groups) and individual-level actors (spontaneous volunteers), which are both made up of *unaffiliated volunteers*. Twigg and Mosel [27] (p. 445) defined emergent groups as "individual citizens coming together to deal collectively with disasters, forming new and informal groups to do so". These are therefore groups that have no pre-existing structure or tasks [28]. They are also characterized by a flat hierarchy, operating with only a few simple rules and a highly fluid leadership structure [29]. Additionally, these groups are often short-lived in that they tend to form and disband quite suddenly [27]. Emergent groups can then be understood as spontaneous *organization* volunteers. At the same time, spontaneous *individual* volunteers act more independently, at least initially, yet both forms address the same problem as the other converging actors [2,28]. Emergent groups and spontaneous volunteers undertake diverse tasks in preventive work, acute situations, and post-crisis recovery. The relevant tasks might involve raising awareness of hazards, opposing initiatives the volunteers believe increase security risks, taking part in search and rescue operations, providing food, drink, and shelter, collecting and distributing relief supplies, contributing to rebuilding efforts, and raising funds for victims [13,27,28,30].

In addition, research has exposed the growing role of digital volunteers. Smith et al. [6] (p. 120) wrote of *disaster knowledge workers*, that is, volunteers who operate "behind the scenes providing primarily communicative and coordinating support". These volunteers might contribute by distributing information, connecting people and materials, and reporting on local conditions. Spontaneous volunteering does not then take place only on the ground but also in virtual spaces [1,10]. Whittaker et al. [2] suggested that because digital volunteerism does not require volunteers to commit for long periods or even to be close to the disaster site, it is likely to become more widespread in the future.

Although the DRC typology is widely used and seen as a useful analytical tool and a framework to help understand different types of disaster volunteering [2,21], it has also been the subject of constructive criticism. For example, Strandh and Eklund [21] criticized the typology for its bluntness and the fact that it places too much emphasis on the assumed primacy of established organizations in a disaster response context. Moreover, Strandh and Eklund [21] (p. 344) considered that the analysis of disaster volunteering is guided by dichotomies (such as formal–informal, beneficial–challenging, and affiliated–unaffiliated), causing the problem where “the legitimacy and accountability of dominant actors in disaster management are thereby assumed, and the opposite becomes true of other actor types”.

2.2. Tensions Related to Disaster Volunteerism

One of the key concerns regarding disaster volunteering is the decline in the number of affiliated volunteers in type I and II organizations. For example, the study by Raisio et al. [31] reported that a broad sample of NGO representatives shared the concern that the average age of volunteers is increasing and that young people do not want to commit themselves to voluntary work as previous generations did. This concern is reflected especially in the research on volunteer and contract firefighters, particularly in rural areas [7–9,24]. Studies suggest a range of underlying causes of the issues of attracting and retaining volunteers, including: long-term demographic change, changes to volunteering that move it toward being more episodic, increased employment commitments and the related time constraints, and the professionalization of volunteering with increased reporting, administration, and training requirements.

With regard to the last issue of the professionalization of volunteering, a paradox forms where volunteers “would like to have more core responsibilities to maintain their motivation to continue volunteering” when at the same time “the more specific tasks volunteers acquire, the more control and responsibility there is from the state—diminishing also the freedom to choose one’s activities” [32] (p. 239). Difficulties attracting and retaining volunteers may eventually lead to *philanthropic insufficiency*, which refers to a volunteering system’s “inability to generate resources on a scale sufficiently adequate and reliable to accomplish the given task” [33] (p. 972) (see also [34]). If that situation came to pass, the consequences related to climate change, that is, the increased number, severity, and complexity of disasters, would likely increase the demand for volunteer and contract firefighters and other disaster volunteers [7,8,17,18].

Although the increase in short-term, episodic, and spontaneous volunteering offers one explanation of the problems faced by traditional volunteering, it can still be seen in a broader context as one solution. Not only climate change as described above, but also issues such as population growth and expanding urbanization call for additional surge capacity in the form of spontaneous volunteers and emergent groups to respond to more frequent and severe future disasters [2,12,21]. However, various tensions surround the activities of these unaffiliated volunteers.

One such tension is the so-called *involvement and exclusion paradox* of spontaneous volunteering. Harris et al. [35] (p. 364) described this paradox as “one in which people who want to be involved in responding to an unplanned event can face numerous pressures for their exclusion, even when there is, objectively, a need for the help that they are offering and the resources they can contribute”. The paradox is thus particularly a matter of tension between spontaneous volunteers and formal governmental or nonprofit emergency management organizations. While many people desire to help, others are unwilling or unable to accept that help. Nevertheless, this should not be understood as dichotomous, with alternatives being solely included or excluded. The inclusion of spontaneous volunteers and emergent groups is a dynamic phenomenon and there are options other than the two extremes [19,35,36].

One such option would be to consider tasks involving less risk [12,35]. Scanlon et al. [37] pointed out that while handling a disaster such as a hazardous chemical spill

demands considerable expertise, the tasks supporting disaster response are often not complex. They do not necessarily require specialized expertise, as when there is a need for sandbags to be filled, for guiding services, or for the provision of food and drink. Another option involves the role of *boundary spanners* [10,23,38]. That role can include both online platforms and individual digital volunteers acting as an interface between formal governmental or nonprofit emergency management organizations and unaffiliated volunteers. It is a role that contributes to coordinating citizen convergence in the disaster response context.

It is established that the *inclusion* of spontaneous volunteers and emergent groups can create challenges. In addition to liability issues and blurring the situational picture, these type IV actors have been known to allow their enthusiasm to propel them beyond what they are permitted to do by law. That enthusiasm can thus lead them into situations where they themselves need to be rescued or where they compromise tracks during a search and rescue operation [5,12,27]. The impact of crises on the mental well-being of unaffiliated volunteers should also be taken into account [4,39]. However, there are also challenges with the *exclusion* of spontaneous volunteers and emergent groups. For example, various opportunity costs may emerge such as spontaneous volunteers or emergent groups mounting a disaster response independently or taking offense when the public authorities do not court their involvement, then publicizing that dissatisfaction through traditional or social media [5,35].

The exclusion of spontaneous volunteers can also be disguised as *symbolic inclusion*, meaning “the illusion of involvement in the official response operation” [23] (p. 526). Symbolic inclusion might involve taking advantage of various access points for spontaneous volunteers, such as registration via online platforms, without having a plan or even an intention to use the registered volunteers. With regard to the challenges associated with type IV actors, it should be noted that *disaster myths*, which do not realistically portray the civilian population, may lead to those challenges being exaggerated. As Lorenz et al. [40] (p. 363) state, “if the population is viewed as being incapable, panic-prone, shock-prone, or even dangerous, then it is only reasonable that professional rescue teams at the scene do not perceive both the help that is being administered, as well as any existing aid potential as found among the populace” (see also, [29,41]).

Fundamentally, the relationship between governmental or nonprofit emergency management organizations and unaffiliated volunteers demands a balance between self-organization and coordination. The challenge is that overly tight coordination, which can cross over into control, reduces the agility and adaptivity of spontaneous volunteers and emergent groups to the extent that their role is reduced to merely offering extra pairs of hands. The role then loses its self-organizing and emergent nature [5,10,42]. Too many guidelines and excessive control may thus create a risk of completely suppressing spontaneous volunteering. Similarly, an excessively *laissez-faire* approach can create inefficiencies and frustrate volunteers [11,43].

Measures proposed to promote a balance between self-organization and coordination include employing *shepherding management*, which is akin to “a shepherd negotiating the direction rather than giving specific instructions to the individual” [12] (p. 902); and in the context of social crises, *structured self-organization*, defined as giving “space to self-organized processes but enable their efficiency by basic structures, clear (although often very short time) goals, and organization” [11] (p. 115). An important aspect of the balancing act is mutual adaptation. Spontaneous volunteers and emergent groups must adapt to the mechanisms and structures of established and expanding organizations, but governmental or nonprofit emergency management organizations must also adapt their management systems to embrace unaffiliated volunteers [36,44].

Although the discussion above refers primarily to types I, II, and IV of the DRC typology, type III actors are also subject to various tensions. Extending organizations are often more effortlessly included in disaster response as they are considered to offer valuable skills and resources, organizational affiliation (e.g., farmers and restaurant owners) functioning

as a proxy for the available skills and resources [23]. However, tensions are created as not all extending organizations want to operate under the control of governmental or nonprofit emergency management organizations, combined with the fact that their experience of disaster response may be extremely limited [2]. The literature review of Strandh and Eklund [21] (p. 335) reported that extending organizations have received only limited attention in disaster management research, and “a more refined understanding of volunteerism could be gained from more study of how extending and emergent forms of organization intersect, such as construction companies or ad hoc search and rescue groups”.

3. Data and Methods

3.1. Qualitative Sentiment Analysis

Beigi et al. [45] (p. 313) defined sentiment analysis as “a class of computational and natural language processing-based techniques used to identify, extract or characterize subjective information, such as opinions, expressed in a given piece of text”. Sentiment analysis thus frequently uses big data collected from social media channels such as Twitter to study people’s sentiments on various topics, events, individuals, or organizations [46]. Traditionally, quantitative sentiment analysis relies on polarity classification; that is, the sentiments expressed are classified as positive, negative, or neutral [45,47].

There are various examples of how sentiment analysis has been utilized in disaster management research [48–52]. Studies highlight how sentiment analysis can help, for example, to improve situational awareness during the different stages of disasters [45,49]. Sentiment analysis would then help to understand the general mood of civil society and related concerns. As Gaspar et al. [15] (p. 179) stated, “analysis of social media data seems particularly useful when unexpected and potentially stressful events occur and there is need of understanding how Internet users are making sense of them”.

However, *quantitative* sentiment analysis has been criticized [15,52]. That criticism relates to the ability of a typical computer-based analysis to identify sarcasm or humor, among other things. More importantly, a reported weakness of computer-based analysis is its lack of depth. Gaspar et al. [15] (pp. 180–181) pointed out that results provided by quantitative sentiment analysis “may only be the visible part of the ‘iceberg’”. Complementary *qualitative* sentiment analysis can ideally deepen understanding by providing more context and helping to understand the nuances of different sentiments [52].

3.2. Data Extraction

The data used in this research were collected from various social media platforms using the Mohawk Analytics search engine. Mohawk Analytics gathers almost all social media discussions in Finnish, so the search included Twitter, Facebook, Instagram, discussion forums, news comments, and blogs and related comments. The search was not limited to any particular platform as the goal was to collect a rich selection of data.

Experimentation with the Mohawk Analytics search engine led to our choosing *Kalajoki* as the search keyword. The fire was widely known among the Finnish public as the *Kalajoki forest fire*, and the hashtag *#Kalajoki* was also commonly used in the context of the forest fire. Kalajoki is quite a small municipality in Finland with 12,432 inhabitants in 2021, so the search with such a general search term did not spread as widely as it would have if the subject had been a bigger city. If the keyword *forest fire* was included (with the OR-operator), results involved a significant number of discussions unrelated to the Kalajoki forest fire (for example, forest fire warnings in Finland and forest fires in general). The search engine can inflect Finnish, so no inflected forms of Kalajoki were needed. The search was also supplemented with a structured manual search to increase the data coverage. Again, by experimenting, the time range of data collection was set as three weeks from 26 July 2021 (when the forest fire started) to 15 August 2021 (a week after the responsibility for monitoring the extinguished fire was passed on to the relevant landowners). The end date ensured that data on the follow-up discussions related to the disaster were captured.

The initial sample comprised 6452 social media messages. Data filtering proceeded through four stages. First, retweets were removed as they did not produce relevant information for this study. Additionally, social media messages produced by media outlets were removed because they were essentially only linked to news-on-news agency websites. That first exclusion round removed 2638 messages. Second, 1611 messages unrelated to the forest fire were removed. Third, 1515 messages unrelated to volunteering were also removed. Fourth, a structured manual search added 118 relevant messages. In addition to the textual content, the database generated by the Mohawk Analytics search engine includes a hyperlink to the message, the username of the author, and the time of publication. The manual search reviewed those hyperlinks to find relevant social media threads from which to extract new messages. The four stages of data filtering provided a total of 806 social media messages relevant to the aims of this study (see Figure 1). The majority of the messages were from Twitter ($n = 532$) and Facebook ($n = 108$), while Instagram included only six relevant messages. The remainder of the messages were forum posts ($n = 137$), news comments ($n = 21$), and blog posts and comments ($n = 2$). Finally, the data were not reduced on the basis of the author of the message (excluding media outlets) to reflect the aim to obtain broad-based information on the sentiments of different societal actors.

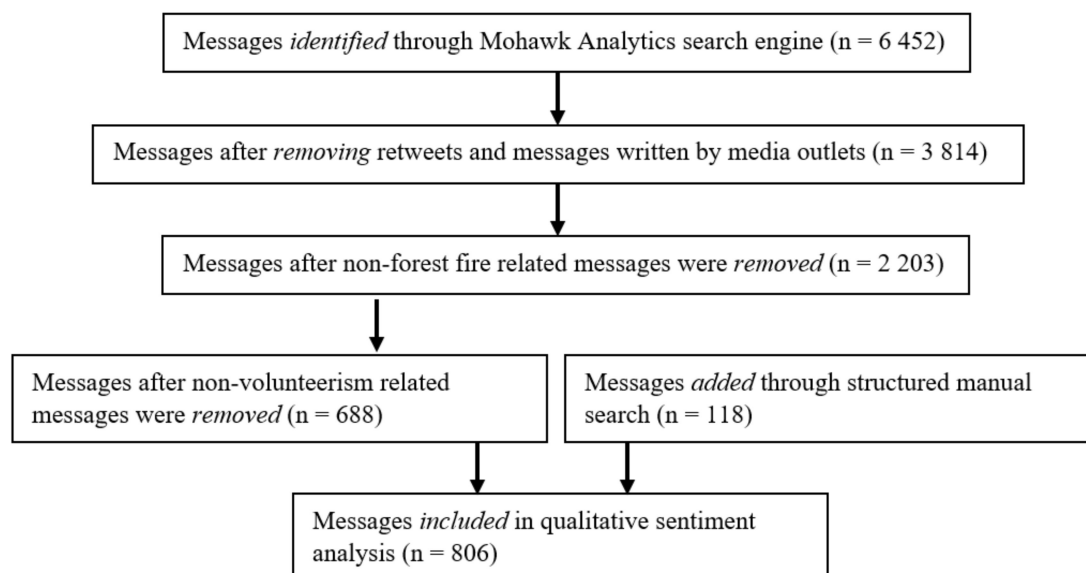


Figure 1. A flowchart showing the data extraction process.

3.3. Data Coding and Analysis

All coding was conducted manually. The extracted data frequently included mentions of more than one entity in each social media message, so data coding was implemented on an entity level (see e.g., [45]). The coding process therefore focused on every entity (i.e., volunteer group) described in each individual social media message. The coding process consisted of three stages. During the first stage of coding, the data were manually categorized to match the volunteer groups following the method of Danielsson and Eriksson [30]. The categorization applied was (1) organized volunteers (i.e., type I and II actors), (2) volunteers from extended organizations (i.e., type III actors), (3) and unaffiliated volunteers (i.e., type IV actors).

In the second stage, the data were coded based on the sentiments (i.e., sentiment coding) expressed in the social media messages on the aforementioned volunteer groups. The sentiments detected were categorized as supportive, critical, neutral, or unclear (see e.g., [48]). *Supportive* messages portrayed volunteers in a positive light or expressed a positive attitude about them. *Critical* messages portrayed volunteers in a negative light or expressed a negative attitude about them. In *neutral* messages, no positive or negative sentiments were expressed, while *unclear* messages did not include enough information to

elicit the exact nature of the sentiment. The data were manually coded by the first and third authors who had familiarized themselves with the dataset. The coders applied a consensus building process to clarify operational definitions for each sentiment category to ensure they had a common understanding of the classification system. Any disagreements over the coding were discussed and resolved during that collaborative coding process.

In the third stage, the social media messages were coded according to their text content (i.e., content coding) (for similar approaches, see [15,52]). The images or videos associated with the messages were then excluded from the coding process. Social media messages were analyzed with an abductive approach to content analysis that encourages moving back and forth between the inductive and deductive approaches during the process of analysis (see e.g., [53]). Third-level categories were formed inductively while the first- and second-level categories more closely reflected the theory (see Figure 2). The first author of the article was responsible for the initial content analysis while the co-authors acted as *critical friends* encouraging the consideration of alternative interpretations (see [54]). In the following results section, all direct quotations from social media messages were translated from Finnish into English, with particular effort made to preserve latent cultural and symbolic meanings within the messages. Emojis were omitted, but the authors tried to ensure that the meaning of each quote was not diluted as a result.

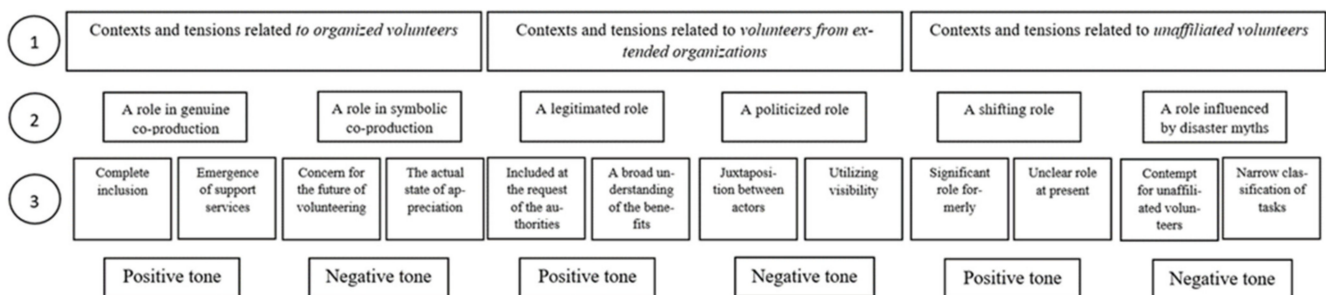


Figure 2. The structure of content analysis.

4. Results

4.1. Contexts and Tensions Related to Organized Volunteers

Sentiments associated directly or indirectly with organized volunteers ($n = 425$) were largely positive. Two groups of social media messages stood out among these positive messages. The first group consisted of messages *explicitly* supporting organized volunteers ($n = 210$). The second group contained neutral messages that mostly factually described the inclusion of organized volunteers in firefighting and support activities. That group could be *implicitly* interpreted as positive ($n = 137$). Critical ($n = 20$) or unclear ($n = 58$) messages were a minority among the messages. The actual content of the social media messages could be divided into two broad themes: the genuine and the symbolic co-production of services.

4.1.1. Genuine Co-Production of Services

Co-production is understood in the context of this study as a voluntary work carried out in close cooperation with public authorities and where there is a strong focus on the public good [31,55]. Such activity was reflected in those neutral messages factually describing the participation of contract fire brigades. The messages strongly illustrated how a large number of contract firefighters were involved in extinguishing the forest fire. It is also illustrative that *#sopimuspalokunta*, which translates as contract fire brigade, was the eighth most common hashtag in the overall data. Similarly, the realization of genuine co-production was reflected in *#yhdessä* (*#together*) being the twelfth most common hashtag. This co-production was highlighted in many ways in the social media messages. Both the formal governmental and nonprofit emergency management organizations emphasized the importance of co-production in the context of the Kalajoki forest fire:

“Contract firefighters are a hugely important part of the fire and rescue services. Even now, a large proportion of those involved in extinguishing the fire in Kalajoki are people with a background in contract fire brigades. The desire to help is great! #together”.

“Finland’s fire and rescue services are manifold. Everyone is needed, as #Kalajoki showed. Awesome commitment across the branch of activity, regardless of the type of fire department. Not forgetting the Defense Forces, the Border Guard, private actors, and villagers. #together”.

Those involved in the firefighting work also received appreciation from individuals and organizations not involved in the Kalajoki forest fire. Firefighters were, for example, called “everyday heroes” and “real men”. Contract firefighters were praised, among other things, for canceling summer vacations to volunteer to fight the forest fire. The praise also highlighted the role of contract fire brigades in more than just the case of Kalajoki:

“Without you contract fire brigades, quite a few square kilometers of area would be without any kind of fire and rescue services. People just do not always realize this when they live in the city”.

“Thank you! Thank you very much! Contract fire brigades and emergency response units are doing tremendous work that not everyone notices”.

The social media messages related to the organized volunteers also praised the support services. In the case of Kalajoki, organized volunteers working in support services could be categorized as type II organizations because, in contrast to contract firefighters, they are not usually involved in the day-to-day activity of the fire and rescue service. The messages outlined how deploying a large number of people demands considerable quantities of food and also people to maintain the firefighting equipment. People commenting also pointed out that the role of support services is often overlooked by the media and the firefighting organizations themselves. However, the general view was that without the support services, forest fire fighting operations would not be sustainable:

“Support services in their various forms are far too undervalued and highlighted part of fire department activities. A big thank you to the support services in Kalajoki and other forest fires”.

“I take my hat off to . . . and humbly bow to these [volunteers]. Without the heavy toil of the support services, firefighters would not be able to labor in the woods”.

4.1.2. Symbolic Co-Production of Services

Symbolic co-production is understood in the context of this study as encapsulating processes where public authorities involve volunteers in forms of co-production that prove inadequate or, at worst, offer a mere illusion of participation. Examples can be found of how national strategies emphasize the volunteers’ role but offer inadequate support for the role to be efficiently undertaken [31]. Although there was almost no direct criticism of the organized volunteers *per se* in the social media messages, there were concerns about the future of volunteering. The issue can be reduced to whether organized volunteers have a realistic opportunity to help in the future or if a lack of volunteer resources means the aid remains largely symbolic. For example, the social media messages examined raised concerns about sustaining the number of volunteers, and expressed the hope that the visibility provided by the Kalajoki case would help:

“My own experience is that the activities of the third sector (rescue organizations) require exceptional commitment, so fewer and fewer are actively involved”.

“An important point is that we do not really have too many skilled fire personnel in Finland. A large portion of the firefighters are actually volunteers and when they are becoming [in number] dominated by old men (and this is happening), then we are in trouble”.

“Hopefully, Kalajoki brought more positive visibility, and with that we will also get new volunteers involved”.

While the social media messages in general gave the impression that affiliated volunteers are valued, they also raised some questions about the real state of affairs. This issue came up in two types of messages: Messages expressing a constructive hope that the contract fire service system would be sustained in Finland and those with a more critical subtext. The constructive type of message content, for example, hoped that the well-being of volunteers and the suitability of firefighting gear for long-term situations (such as forest fire) would be guaranteed. Such messages also expressed the hope that the lessons learned from the Kalajoki event would bolster support for contract fire brigades beyond just at the rhetorical level. The second group mostly comprised anonymous social media messages that expressed concern that, for example, contract fire services are being run down and were only appreciated during major crises:

“When there is no major crisis, the management of the rescue service is arrogant to private actors and volunteers. The main idea seems to be that these amateurs should stay out of the accident and fire scenes and let the professionals handle the situations. But when a 300-acre forest fire breaks out, contract fire brigades and volunteers are called in to help. . . . Then they are praised and applauded for what kind of resource they are, which of course is completely true”.

Consequently, the positive comments on genuine co-production described above appeared, to some extent, in a different light. To what extent were social media messages actually about deliberately raising the profile of contract fire brigades? As stated in one message, *“Kalajoki caused a positive avalanche in the communications of fire and rescue services. Maybe even race to the ‘venues’ to give help and wave the flag”.* The same was stated more critically in another message: *“Yes, this fire became a fire to polish the public image of fire brigades. Everyone knows that there were fire brigades from all over Finland. They put announcements in every damn place that the fire department such and such is represented”.*

The question of appreciation also involves discussing how volunteer firefighters should be referred to. For example, in the social media messages, the concepts used in the news articles were corrected: *“This is an excellent news article, except that... Finland has a contract fire brigade system, not volunteer fire brigades”.* The discussions emphasized that at Kalajoki, the contract firefighters were trained firefighters who worked alongside full-time firefighters, although they had volunteered to help. Messages also highlighted that contract firefighters receive remuneration for their work. The term volunteer fire brigade, in turn, was perceived to give the impression of *“a group that rushes recklessly in different directions”.* In this regard, one message commented that the term volunteer fire brigade should no longer be used when operating costs were paid and contracts were adhered to: *“If the department pays, for example, 1/4 of the costs, this is voluntary work, and it is then a big joke to talk about contracts”.*

4.2. Contexts and Tensions Related to Volunteers from Extended Organizations

Sentiments toward volunteers from extended organizations (n = 100) were also interpreted as mostly positive. This positivity was evident in both supportive (n = 66) and neutral (n = 11) messages. The politicization of the issue could be interpreted to some extent as a negative phenomenon, which was reflected in the unclear (n = 23) messages. The themes were divided into the legitimate and politicized role of volunteers from extended organizations in terms of content.

4.2.1. A Legitimized Role

Various volunteers from extended organizations were included in the Kalajoki operation. Social media messages pointed out that this was at the request of the authorities, conferring legitimacy on the activities of the volunteers. As one company stated in its social media message, *“The actual first responders plus other professionals and authorities are doing a*

“bigger” job, but our equipment and men are of great help and available if requested!” The messages mentioned the contributions of farmers, peat producers, workshop firms, and the forest industry, among others. In addition, food donations from companies were mentioned.

There was a broad understanding of the benefits of including volunteers from extended organizations. In particular, the messages pointed out that the machinery used by entrepreneurs and farmers is suitable for transporting water, clearing roads into the forest, and creating firebreaks. However, the role of these volunteers was not previously clear to everyone: *“It would not be immediately apparent that water would also be taken to the fire site by a tractor”*. The messages highlighted how the volunteers from extended organizations supplemented the resources of formal governmental or nonprofit emergency management organizations and how without these volunteers, the damage caused by the forest fire would have been greater:

“As the Kalajoki wildfire raged, a huge amount of water was needed for the extinguishing work. The fire brigades’ own equipment was not enough, so local agricultural and workshop firms were called in to help. #StrongTogether”.

“One must admire the cooperation of the organizations. All in the same boat, from agriculture onwards”.

4.2.2. A Politicized Role

The social media messages related to the Kalajoki forest fire were also linked to other social phenomena, causing the politicization of the issue and intensifying confrontation between different actor groups. A specific example of conflict was between peat producers and those involved in the activities of Extinction Rebellion Finland. Extinction Rebellion is a non-hierarchical and self-organizing activist network that *“uses mass civil disobedience and non-violent direct action to demand climate action”* [56] (p. 375). As such, Extinction Rebellion can be defined more clearly as a type IV organization. The background to this confrontation was, first, that the activists of Extinction Rebellion Finland had recently organized high-profile protests by blocking traffic on two main streets in the capital, Helsinki. In addition, the Ministry of Economic Affairs and Employment had unveiled plans for phasing out the use of peat as an energy source in Finland. Together, these actions led to social media communications highlighting the role of peat producers in extinguishing the Kalajoki fire and drawing attention to the absence of Extinction Rebellion Finland activists. This juxtaposition appeared, for example, in the following messages:

“Hey Extinction Rebellion, now instead of loitering on the streets, you could set out to do practical climate actions and help put out the forest fires. The peat producers you slander are already there to help firefighters save carbon sinks”.

“Extinction Rebellion, go save the climate. Take a cue from peat producers”.

“It is true that it is absurd to mock Extinction Rebellion at the expense of the Kalajoki fire. But at the same time, respect must be shown to peat producers who, despite the treatment they have received, are ready to help”.

The peat producers and their supporters thus took advantage of the visibility offered by the Kalajoki fire incident. Social media messages questioned, for example, how Finland could prepare to deal with future forest fires if the equipment of peat producers were destroyed: *“The equipment of peat producers has been needed to help put out the wildfires, which fortunately has still been available in our country. As a result of the downsizing of the peat sector, also the machinery and equipment of the peat sector will be destroyed or sold to other countries”*. As stated in one message, the Kalajoki fire became a kind of profile-raising competition between various actor groups.

4.3. Contexts and Tensions Related to Unaffiliated Volunteers

Sentiments toward unaffiliated volunteers (n = 343) were mostly negative, as evidenced by the high number of critical social media messages (n = 112). Unclear messages

(n = 174) for the most part also had a negative emotional tone. Supportive (n = 30) and neutral (n = 27) messages were clearly a minority. In interpreting these results, it was important to take into account the politicization of the debate, which made it difficult to interpret the messages and explains the large number of unclear messages. However, although many of the messages were related to Extinction Rebellion Finland (a type IV organization in the context of this study), it was also possible to interpret the attitudes toward unaffiliated volunteers in general. In terms of content, the themes encompassed a shifting role and a role influenced by disaster myths.

4.3.1. A Shifting Role

Positive comments related to the unaffiliated volunteers related less to the forest fire in Kalajoki in 2021 than to its predecessor in 1970. The social media messages described how the 1970 fire was *“a shared disaster that was dealt with together”*. Residents from nearby municipalities were assigned to put out the forest fire. One message even described how *“[cars] were stopped by police and a rumor circulated that people were taken directly from cars to put out the forest fire”*. Although there was an element of pressure or even coercion involved, extinguishing the forest fire was described positively as a civic duty and a display of solidarity. In addition, the related communality was described as genuine.

The social media messages also considered, from the point of view of liability issues, the extent to which such involvement of unaffiliated volunteers would be possible today. One thread in particular addressed the question of whether section 37 (1) of the Rescue Act (*“When necessary to save human lives or combat accidents, the officer in charge of rescue operations has the right to order any person able to work who is at the site of a fire or accident or in its vicinity and who has no valid reason to refuse to assist in the rescue operations. In similar circumstances, rescue authorities have the right to order all persons in the municipality who are able to work to immediately come to the site of the fire or accident to assist in rescue operations if the situation cannot otherwise be controlled. This duty may be refused only for a valid reason”*) (Rescue Act 379/2011) that outlines the obligation of people to participate in rescue operations could be activated. The representative of the rescue authority who responded to the thread saw this as an important topic that should be included in a broader discussion at a later date. However, at the time, the representative viewed it as a rather *“dead”* clause. The concerns that particularly stood out involved untrained people being assigned to assist and the supposed fact that quantity would not replace quality.

A decision was made to explicitly exclude unaffiliated volunteers from assisting with the Kalajoki crisis. An official statement explained that the situation was under the control of formal governmental and nonprofit emergency management organizations and that no unaffiliated volunteers were required. In addition, there was an official request that those unaffiliated volunteers wishing to assist stopped contacting the rescue services: *“If we need more civilian personnel for firefighting work, we will organize it separately, and it will be announced through various channels”*. Nevertheless, unaffiliated volunteers were also praised, but for spontaneously offering food and refreshments to firefighters. For example, one representative of the rescue services thanked *“private individuals, suppliers of tasty buns, pizzas, pancakes, candies, etc.!”*

One tweet thread discussed the fourth sector, which is seen in Finland as including spontaneous volunteers and emergent citizen groups [5]. The thread content highlighted that the fourth sector should be taken into account in advance in contingency plans, as the desire to help can be great. Messages also pointed out that an attempt had been made to raise the role of the fourth sector in discussions a few years previously, but that the time was not appropriate. The social media messages emphasized that the fourth sector should be involved only in an organized way and that this organizational process would be the responsibility of the third sector. Oil disaster preparedness was highlighted as an existing example of the organization of the fourth sector. Fundamentally, the social media messages acknowledged that *“extinguishing a forest fire requires skill and is a dangerous job, so it cannot be based solely on spontaneous volunteering”*. Nevertheless, some messages were skeptical that

the capacity of the Finnish rescue service could withstand cascading large-scale disasters in the future. It was, for example, (over)stated that *“the entire country’s equipment is already in use to put out such a small forest fire area...”*.

4.3.2. A Role Influenced by Disaster Myths

Social media messages revealed contempt for unaffiliated volunteers. This was accentuated by the politicization and confrontation described above. The contempt came to the fore especially in the distinctions made between “professionals” (i.e., full-time and contract firefighters) and “amateurs” (i.e., unaffiliated volunteers). Amateurs were widely seen as getting in the way of professionals and causing danger: *“The last thing we need is the unskilled [amateurs] among the smoke getting smoke poisoning, and the firefighters would then have to save them from the midst of the flames”*. In particular, the messages questioned the ability of urban dwellers to help. They were seen as lacking basic skills and people who were *“in the countryside, like fish on dry land”*. The messages also reduced the role of civilians to some extent to disaster tourists to be kept outside the fire zone. Furthermore, the suggestions that amateurs should be included in the firefighting work were seen as lacking appreciation for professionals and their required qualifications. One (sarcastic) message did also consider the extent to which professional pride was involved: *“Of course, the professional pride of the world’s best professionals is the most important thing to preserve here, and amateurs are not required to intervene”*.

Negative-toned sentiments were also strongly affected by the narrow classification of tasks, as the context of the majority of the social media messages was explicitly the voluntary work involved in extinguishing the forest fire. However, there were a few messages reminding social media users that there were other tasks. For example, support services, such as those offering catering, were mentioned. As one person stated in a message, *“helping does not mean you have to go out somewhere to put out the flames. There are many ways to help”*. In addition, the possibility of offering crash courses to unaffiliated volunteers was raised: *“I myself know how demanding the forest fire is and the dangers of it, so experts and instructions are needed for the quick training”*. In addition, it should be noted that social media messages focused on the response phase of the Kalajoki forest fire, which might account for the politicization of the debate, as shown in the following messages:

“The comments have slandered Extinction Rebellion and other ‘tree huggers.’ If one looks beyond the end of one’s nose, one would realize that [Kalajoki forest fire] is precisely such a situation that Extinction Rebellion and other ‘tree huggers’ are trying to prevent”.

“In Kalajoki, a large number of people have been working hard for a week. Extinction Rebellion, on the other hand, works to prevent more fires in the future”.

5. Discussion

Previous research has strived to identify media frames relating to portrayals of public and authority responses in the context of a forest fire [57]. Here, however, the focus shifted to a review of social media rather than traditional media. The social media data collected formed an interesting lens through which to scrutinize attitudes to the potential change in disaster volunteering and the contexts and tensions involved. Based on this analysis, the reality of disaster volunteering appeared to be at least twofold, if not consisting of several parallel realities.

Looking at the *positively* charged social media messages from the data offered an initial picture of reality (i.e., an explicit reality) (see Table 1). In that reality, the co-production seemed genuine and extensive. There was a complete inclusion of affiliated volunteers (type I and type II organizations), which was especially true for contract firefighters (see also, [23]). The role and importance of the often-overlooked support services also emerged strongly in the data (cf., [30]). In addition, the role of volunteers from extended organizations (type III actors) was legitimized, as they were considered to have valuable skills and resources to offer. Organizational affiliation (e.g., farmers, peat producers, workshop owners, and the forest industry) then served as a proxy for the available skills and resources (see also, [23]).

Table 1. The two different realities of disaster volunteering.

	Examples	Sentiments with a Positive Tone (Explicit Reality)	Sentiments with a Negative Tone (Implicit Reality)
Established organizations/ type I actors	Voluntary emergence organizations such as volunteer or contract fire fighters.	Important part of the fire and rescue services. The object of praise.	Concerns over sustaining the number of volunteers. Valuation beyond the context of major disasters.
Expanding organizations/ type II actors	Support services such as the Red Cross or the female units of volunteer fire brigades.	From overlooked and undervalued to a notable actor.	Concerns over sustaining the number of volunteers.
Extending organizations/ type III actors	Private sector organizations such as farmers and workshop firms; voluntary organizations such as traditional community associations.	Valuable skills and resources to offer. Organizational affiliation serving as a proxy.	Taking advantage of the visibility offered by the forest fire. Adverse competition for profile raising action.
Emergent organizations/ type IV actors	Emergent, self-organizing groups such as Extinction Rebellion Finland; unaffiliated volunteers.	Extra pairs of hands that can be invited to help in an organized way and with limited tasks if needed.	Actors to be excluded. Seen as unskilled and only getting in the way of professionals.

In this first reality, sentiments on unaffiliated volunteers (type IV organizations) were also somewhat positive or at least neutral. Unaffiliated volunteers were seen as extra pairs of hands that can be invited to help in an organized way and with limited tasks if needed (see also [5,31]). Officials decided in the case of the forest fire in Kalajoki that unaffiliated volunteers would not be involved at all, not even on a symbolic level (see also [23]). The data also highlighted the importance of discussing the role of unaffiliated volunteers and ensuring contingency planning takes them into account. However, no reflection on mutual adaptation was raised in the data [36,44].

Scrutiny of the *negatively* charged social media messages in the data provided a slightly different picture of reality (i.e., an implicit reality) (see Table 1) and revealed a kind of co-production friction. The question then arose as to the extent to which the positive sentiments were merely a veneer, that is, the visible part of an iceberg [15], or even camouflage. This friction applied to all groups of volunteers but was particularly evident for type I and type IV organizations. For example, in the case of affiliated volunteers, the question arose as to how they would be valued beyond the context of major disasters and whether appreciation remains at the level of rhetoric or whether it is also reflected in tangible actions. The issue reflected a broader debate on whether the volunteers in general, in any form, should be involved in safety and security.

In the case of unaffiliated volunteers, disaster myths came to the fore that confirmed the findings of previous studies (e.g., [5,29,40,41]). The general population, and especially city dwellers, were seen as unskilled and only getting in the way of professionals. Sentiments on unaffiliated volunteers emerged mainly as dichotomous alternatives on whether they should be included or excluded. For example, the possibility to undertake lower-risk tasks was highlighted to only a limited extent (see also [12,35]). The complex phenomenon was then reduced to only a few choices. In relation to this, Lorenz et al. [40] (p. 363) stated: “*To what extent these obstacles [such as the lack of training] are realistically assessed by professional rescue forces, or in other words, would these obstacles be perceived as significant if the underlying attitudes resulting from disaster myths no longer played a role? If so, would these problems then be deemed inconsequential in the face of their more starkly visible benefits?*”.

Finally, a striking phenomenon in the data was the politicization of the debate, as is apparent in social media messages. The polarization of views was evident even in such an apolitical case that in the grand scheme of things was still a rather minor local event that did not even directly affect the local people (not a single resident was in real danger, nor were any buildings destroyed). The seemingly apolitical issue, putting out a forest fire, was

deliberately used to advance either individuals' interests or those of a particular group, such as taking credit for being a good citizen or a responsible actor in some other sense. The us-and-them mentality was not only evident in the co-production friction between different actors but started to emerge as a more general phenomenon related to several ideologies.

6. Conclusions

This study found disaster volunteering to be surprisingly traditional. The transformation in disaster volunteering highlighted in other studies (see [1]) was not a prominent feature. One reason may be that the context of the study was a forest fire; a form of disaster requiring special skills and equipment to deal with (see also [37]). In addition, safety at work is one of the key issues in forest fire management [58]. Threats include, but are not limited to, heat stress, inhalation of products of combustion, being stranded behind the fire front, and physical exhaustion. However, as has been noted, in forest fires, the activity is often so long-term that the organization of support services becomes necessary [58]. Support services are considered lower-risk tasks for which unaffiliated volunteers can offer assistance and where voluntary emergence organizations (type I actors) ideally coordinate the use of unaffiliated volunteers (type IV actors) to ensure that the resources offered and actual needs align [59].

Although it is a moot point to what extent the Finnish contract fire brigades can be interpreted as "authentic" (type I) volunteer organizations, these types of organizational actors featured most strongly in the social media messages captured. The role of contract fire brigades is fundamental to the whole Finnish fire and rescue service system, and therefore, the results reflected the current nature of the field (see also [7,24]). Another possible reason for this traditional view of disaster volunteering could be that Finland has not faced many large-scale crises since the end of the Second World War and has mainly tackled smaller crises without the help of unaffiliated volunteers [5]. However, the importance of this issue is highly likely to increase in the future as disasters attributable to climate change (e.g., forest fires and floods) increase in scale and volume globally, including in Finland [16,60]. It must thus be borne in mind that as the world changes, so can volunteering. For example, Mateiu-Vescan et al. [61] (p. 1213) considered that "some practices may not be needed anymore (for example, volunteers in the army in some countries) and new practices arise (for example, volunteers for climate change or other certain events)".

It is also important to remember that the social media messages focused on the *response* phase of the disaster life cycle. Perhaps stronger emphasis on the *mitigation* phase would have highlighted the role of some type IV organization more positively. For example, Extinction Rebellion Finland's goal as a self-organizing and emergent citizen group is to raise awareness of environmental hazards and to oppose initiatives that might increase security threats (see also [27]). The role of digital volunteering [6] might also have appeared if the variety of disaster phases had been acknowledged more acutely in the social media messages. The results of the sentiment analysis led to a conclusion that under the prevailing circumstances, the sentiment expressed by #StrongTogether and genuine co-production between professionals and unaffiliated volunteers remains more of myth than reality, at least in the context of disaster volunteering.

While there is nothing new in combining social media data with the crisis context, the use of social media data to expose sentiments relating to disaster volunteering can be considered an innovative and useful approach, especially as qualitative content analysis provides a deeper understanding of the context and tensions behind the analyzed sentiments. However, the social media data used in the study necessitates ethical reflection. It is important to note that the use of such openly available data demands the minimization of potential harm from research [62]. Although this study did not address a particularly sensitive topic or vulnerable groups of people, the authors did attempt to minimize any potential harm. First, the material was only collected from open sources and not from closed discussion groups. Second, in the case of direct quotations, no potentially harmful quotations by an identifiable writer were incorporated. Third, translating direct quotes

into English would largely thwart any attempt to identify the author of a message using a search engine.

It is also worth considering how much relevant data were found, that is, whether the analysis gave a reliable picture of the matter. A structured manual search certainly showed that not all relevant material was found with the Mohawk Analytics search engine. A large number of relevant messages did not mention Kalajoki or the forest fire but did address the issue. The data search did not include non-public social media messages (e.g., private Facebook groups), but the data informing this study had clear patterns and the results were consistent with previous studies set in similar contexts, only using different data (e.g., [5]). It should also be noted that the results cannot be generalized as representing the views of the general public, as many representatives of formal governmental or nonprofit emergency management organizations also contributed data.

The need for further research reflects the issues that emerged from the data such as the need for a broader discussion of the use of unaffiliated volunteers. It would be interesting to study, for example, preparedness exercises involving unaffiliated volunteers. As Lorenz et al. [40] (p. 361) reported, “when professional rescue workers allowed unaffiliated responders to proactively and independently complete assignments, they were consistently astounded by the goal-oriented and pragmatic work of the unaffiliated responders”. Additionally, it could be worthwhile scrutinizing the collaboration between type III and type IV organizations (see also [21]) which, in the context of this study, seemed to be highly politicized and prone to inducing confrontation. With regard to the politicization of disaster volunteering, it would also be useful to examine the role of hybrid media in more detail [63,64] and also that of social media influencers [65–67].

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