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RESEARCH ARTICLE

Exploring the Potential Use of Social Media Platforms and Decision Support Tools in Disaster Management: A Case Study in Istanbul, Türkiye

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Abstract
The increasing frequency and severity of large-scale disasters worldwide necessitate effective disaster management strategies. This article explores the potential use of social media data and Decision Support Tools (DST) in disaster management, focusing on the Istanbul Metropolitan Municipality (İMM) as a case study. Despite theoretical recognition of their benefits, practical implementation of these tools remains limited. This study combines a literature review with a survey of İMM members to understand perceptions and adoption tendencies towards social media platforms and DST. Findings indicate that both tools hold promise in enhancing disaster response processes and aiding information gathering, coordination, and citizen engagement. The integration of DST and social media platforms is vital for improving decision-making and response efficiency during disasters. Overall, the study underscores the importance of utilizing innovative technologies for proactive disaster management, emphasising the need for greater adoption and integration of these tools into existing frameworks.

Keywords: Disaster management • Social media data • Decision Support Tools (DST) • Istanbul Metropolitan Municipality • Disaster response

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In recent years, the world has experienced an increase in large-scale disasters, prompting the development of effective strategies to combat them. Examples include the 2019-2020 Australian Bushfires, the 2020 California Wildfires, the 2020 Atlantic Hurricanes in the United States, the 2020 Floods in New Zealand, the 2020 Amphan Tropical Cyclone in India, as well as floods and landslides in China in 2020 and floods in Germany, Belgium, and the Netherlands in 2021. Türkiye has also experienced significant disasters such as the 6.9-magnitude earthquake in Izmir in October 2020, wildfires in Manavgat and Marmaris in July 2021, the Black Sea Flood Disaster in August 2022, and the 7.8- and 7.5-magnitude earthquakes based in Kahramanmaras in February 2023. These events underscore the critical importance of proactive disaster management efforts.

In response to these challenges, stakeholders, ranging from academics to local authorities and first responders, have been actively engaged in developing innovative practices and interdisciplinary approaches to disaster management. This includes the formulation of comprehensive disaster management plans and the exploration of novel tools, such as social media data and Decision Support Tools (DST). Despite theoretical recognition of their potential, a notable gap remains between the conceptual understanding of leveraging these resources and their practical implementation in disaster response and recovery efforts.

Specifically, the survey in this study tries to find answers for the following research questions: How do municipalities perceive the adoption tendencies and impacts of a social media platform and Decision Support Tool (DST) that combine social media data for collection, analysis, and utilisation in decision-making processes? This study investigates the potential use of social media data and DST in the case of the Istanbul Metropolitan Municipality (İMM).

Literature Review

In recent years, the world has been facing large-scale disasters, and methods to combat them are being developed. Examples of such disasters include the Australian Bushfires of 2019-2020, the California Wildfires of 2020, the Atlantic Hurricanes of 2020 in the United States, the Floods in New Zealand in 2020, the Amphan Tropical Cyclone in India in 2020, the Floods in China in 2020, and the Floods that affected Germany, Belgium, and the Netherlands in 2021, all of which have led to significant social, environmental, and economic consequences. From Turkey, examples include the earthquake of magnitude 6.9 in Izmir on October 30, 2020, the Manavgat and Marmaris Forest Fires in July 2021, the Black Sea Flood Disaster in August 2022, especially affecting Rize, Trabzon, and Artvin provinces, and the earthquakes of magnitudes 7.8 and 7.5 centred around Kahramanmaraş on February 6, 2023, which are referred to as the 2023 Turkey-Syria earthquakes in the literature.

Practices involving academics, local governments, first responders, the public, and general administrations as actors are being developed, and interdisciplinary methods are being employed in the preparation of disaster management plans. It is observed that in recent years, social media data and Decision Support Systems have begun to be included in both the literature and practice of disaster management. For example, during listed disasters, social media tools are heavily used by both official institutions and the public for sharing the effects of the disaster, finding missing persons, and conveying rescue efforts and calls for help. Decision Support Systems, on the other hand, facilitate decision-makers' processes based on the algorithms and mathematics that they are built upon. Particularly in disaster management situations requiring urgent intervention, the Decision Support Tool and social media data play a crucial role in understanding, analysing, monitoring, and making decisions regarding the situation.

Disaster management holds vital importance in reducing the adverse effects of disasters and minimising losses. However, the decision-making process during disasters is fraught with challenges such as time pressure, uncertainty, and risk. Overcoming these challenges and making effective decisions necessitates the development of decision support systems (Çavdur et al., 2021).

In particular, social media platforms play a significant role in assisting decision makers in disaster management processes. In recent years, social media have been observed to play a critical role in post-disaster response activities (Tim et al., 2017). For instance, the effectiveness of social media has been observed in various areas, ranging from facilitating volunteer recruitment after an earthquake to supporting emotional recovery following a hurricane.

While social media has been primarily focused on its short-term aspects, such as emergency response and rapid recovery, research on social networks and social media related to disasters and crises is still quite limited. However, it is increasingly being observed that social media data are being used more extensively in disaster management for purposes such as information dissemination, determining the bigger picture of a disaster, and understanding events unfolding over time (Xiao et al., 2015).

In particular, a study conducted by Tim (2017) on the 2011 Thailand flood disaster demonstrates that social media can be effectively deployed during crises. It should be noted that when traditional media fails to adequately support critical demands during a crisis, social media can successfully contribute to reducing and preventing crisis impacts (Tim et al., 2013).

In this context, developing decision support platforms that can assist decision makers in disaster management is of critical importance. These platforms can provide instant information by analysing social media data, evaluate the impacts of disasters, and

optimise crisis management processes. Consequently, the adverse effects of disasters can be minimised, and a rapid and effective response can be ensured (Tim et al., 2017).

For instance, during the October 2007 wildfires in Southern California, USA, Twitter was used for disseminating time-critical information such as road closures, evacuations, and shelter details (Hughes and Palen, 2009). Additionally, during the January 2010 Haiti earthquake, Twitter became a primary communication platform for community interaction (Fraustino et al., 2012). During the 2011 tornadoes in Joplin, MO, social media was widely embraced by communities; it was used not only to access real-time news but also for providing mutual support and coordinating the rescue process (Fraustino et al., 2012).

Similarly, during and after events such as the 2020 Izmir Earthquake, the 2021 Aegean and Mediterranean Region Fires, the 2022 Black Sea Flood Disaster, and the 2023 Kahramanmaraş Earthquakes, social media tools, especially Twitter, were extensively used for various purposes, including conveying requests for assistance, finding missing persons, soliciting volunteers for debris removal efforts, and announcing open/closed road routes. Adba Analytics, a research company, published a social media analysis covering the first two days of the Kahramanmaraş-centred earthquake disaster, February 6-7. According to a published report, a total of 51.98 million posts were made by 559.06 thousand users related to the earthquake on February 6-7. These posts reached 40.27 billion impressions and had the potential to be viewed 296.99 billion times (Habertürk, 2023).

Twitter has been used as an emergency platform since the early hours, and it has been observed that information flow related to earthquakes is very rapid, with information obtained from other media sources quickly disseminating here (Yıldırım, 2023). Serving as a direct source of information and facilitator of volunteer recruitment, social media has demonstrated its unique potential as an effective crisis response platform; it can spread across many boundaries between communities during crises (Tim et al., 2013).

As stated by Houston et al. (2014), social media can enhance communication before, during, and after disasters. In recent years, social media have evolved from being merely a passive source of information to becoming an emergency management tool capable of distributing real-time alert information, receiving requests for assistance, and creating situational awareness based on user activities (Lindsay, 2011). Additionally, social media can provide an opportunity to express emotions about events, express concern for those affected, and commemorate and memorialise those who have lost their lives in an event (Xiao et al., 2015; Procopio and Procopio, 2007; Hughes et al., 2008; Houston et al., 2014).

Alexander (2014), in their analysis, emphasises the critical role of social media in disaster communication, involving various stakeholders such as communities,

governments, organisations, and individuals. These findings underscore the importance of developing effective communication processes and systems for disaster management. Social media, with their evolving technologies, offer improved disaster communication capabilities, including increased information capacity, dependability, and interactivity. This study highlights the multifaceted role of social media in disaster management, from information dissemination to community support and research opportunities. According to Alexander (2014), social media platforms have emerged as vital tools during emergencies, offering a democratic space for individuals to voice opinions and exchange crucial information, thereby providing insights into public sentiment. Through social media monitoring, emergency response organisations can gather valuable information to improve their reactions to events and manage public perceptions, despite concerns about the spread of harmful rumours. Research indicates that misinformation can be corrected by knowledgeable individuals in online communities. However, the integration of social media into emergency planning remains limited due to concerns about the accuracy of the information circulated. Nevertheless, these platforms facilitate crowdsourcing of information and resources during disasters by leveraging the skills and networks of the public to enhance disaster response efforts. Moreover, social media fosters a sense of community and support among those affected by disasters, contributing to increased optimism and support while also promoting voluntarism through the activities of voluntary organisations. Additionally, platforms like Twitter can be used to launch donation appeals during disasters, albeit with varying impact compared to traditional media channels. Furthermore, social media usage during disasters provides valuable data for understanding social reactions to stress and risk, and researchers have explored methods such as digital ethnography and credibility analysis to study online behaviour in these contexts. As a summary, social media data can be utilised in the context of emergencies and disasters in (1) listening function, (2) monitoring situations, (3) integration into emergency planning, (4) crowdsourcing and collaborative development, (5) furtherance of causes, (6) creating social cohesion (7) research (Alexander, 2014).

Developing effective policies to address natural disasters, such as floods, wildfires, earthquakes, and landslides, is a critical global imperative for policymakers. The decision support tools (DST) is an information system designed to assist people in decision-making processes. Its primary purpose is to provide decision-makers with tools to present information, analyse it, and enhance decision-making processes. Decision Support Tools (DST) have evolved since their inception, initially focusing on interactive computations in semistructured decision-making contexts. DSTs integrate specific and general decision support tools into organisational systems to assist decision makers and stakeholders (Filip et al., 2004). DST encompasses various elements, including decision-makers, input data, decision-making processes, and output data involving evaluation criteria (Wallace, Balogh, 1985).

Various emergency or natural disaster conditions lead to unavoidable consequences that affect multiple aspects of life, such as the maintenance of daily life, welfare, health, economics, and strategic planning and management. Dealing with the problems caused by such extraordinary situations can be challenging because of the unique emergency plans and operations required for each situation.

DST aims to evolve with user habits, be interactive and controllable, recognise non-routine uses, and adapt to the peculiarities of human decision-making processes (Wallace, Balogh, 1985). Among the features of DST are providing support without replacing human logic, aiding in unstructured and semi-structured problem-solving, being flexible and adaptable, user-friendly, and integrating analytical models with data access functions. DST aims to improve decision-making process efficiency and quality by focusing on objectives rather than efficiency or cost reduction (Cioca et al., 2010). In general, while aiming to alleviate decision-makers' efforts, increase their capacities, and facilitate semi-structured problem-solving processes, DST aims to maintain human control over decision-making processes (Cioca et al., 2010).

A disaster's lifecycle comprises three stages: the prevention/alert stage, the disaster stage, and the post-disaster stage. During the prevention/alert stage, signs and risks of a potential disaster are identified, and this information is communicated to relevant parties for the purpose of issuing warnings and taking necessary precautions. During the disaster stage where the disaster occurs, its adverse effects emerge. Rapid and effective intervention is crucial at this stage, with rescue and emergency aid activities being conducted to minimise loss of life and property. In the post-disaster stage, the process of repairing the damage caused by the disaster and recovery begins. Efforts are made at this stage to make various improvements and reconstruction to return society to normalcy while also providing support and psychological healing to those affected by the disaster.

Literature review suggests that for successful disaster management, social media data, which represent active information, should be used as a source, and Decision Support Tools should be used for their facilitative effects on management and monitoring. However, despite theoretical discussions on this matter, it is still observed in practise that institutions and organisations related to disaster management do not widely use social media data and Decision Support Tools.

Social Media Platforms

In this section, the Social Media Platform developed within the scope of the C2IMPRESS[1] Project is explained. Relevant literature has demonstrated that social media data enhance disaster intervention capacity. This is because social media data

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contain first-hand information. However, there are also drawbacks. It can contain manipulative, speculative, provocative, biased, and false information.

Nevertheless, both institutions and citizens use social media during the pre-disaster, disaster, and post-disaster periods. Houston (2014) listed the functions of social media usage based on these periods. According to Houston (2014), sharing information messages related to disaster preparedness, issuing disaster warnings (pre-disaster), sending or requesting help and guidance, making situation reports, sharing location information (during disaster), documenting experiences, sharing news, creating awareness, engaging in socio-political discussions, and expressing emotions (post-disaster) are shared.

Before designing the development stages of the Social Media Platform for the C2IMPRESS Project, Sampaş team members conducted a situation analysis. We examined good examples, identified deficiencies in existing applications, and described deficiencies in the literature. These were prioritised to be addressed in the design of the social-media platform.

The platform serves the purpose of collecting, storing, monitoring, and visualising social media data both historically and in real-time. The architecture of the Social Media Data Analytics Platform consists of various components that allow the gathering of data from different sources for analysis, storage, and visualisation, amalgamating vast amounts of information into a single platform. This enables end users to access refined and transparent disaster-related social media data. Data collection is facilitated by sending real-time requests through the APIs of platforms such as X (Twitter), Instagram, Youtube, TikTok, and Gdelt. In other words, a social media platform is formed by the convergence of various social media tools. The proposed method collects data from alternative sources, allowing them to be analysed together. The platform provides analyses such as metrics and sentiment analysis. In addition, the proposed platform ensures the reliability and transparency of data.

Four models were developed to interpret data from social media platforms. These models are tailored to focus on different analysis domains, thereby enabling in-depth data examination.

The first model aims to identify disaster-related posts to ensure the reliability of the data by categorising them as either disaster-related or not. These data are visualised through graphs, showing the proportion of labelled data on a timeline. This graph illustrates changes in interest in the topic during and after the disaster, indicating how long the disaster resonated and when interest in the topic waned. This method is useful for sociological studies.

The second model is used for sentiment analysis, assessing the emotional tone of texts as positive, negative, neutral, angry, etc., based on pre-defined emotions. This helps gauge the emotional intensity of the content.

The third model, dynamic clustering for content analysis, identifies whether content discusses political, religious, or voluntary themes. By analysing text content identifies prominent themes, thereby determining the primary focus of the content.

The fourth model aims to understand the type of disaster, whether it is an earthquake, wildfire, heatwave, landslide, or flood. The goal is to accurately classify and categorise a disaster based on information shared by users.

These models are designed to analyse various aspects of social media data, providing users with comprehensive insights.

In the development of these models, Machine Learning techniques were utilised, with the Logistic Regression model being employed as a supervised learning algorithm for classification purposes. To improve data quality, standardization was applied to the training dataset before model development. Additionally, stop-wording was performed to enhance the analysis quality. Through the developed models, speculative, provocative, biased, and false information among social media data can be eliminated, ensuring data reliability. Furthermore, the platform is compliant with ethical standards in line with EU standards. Only publicly shared information by users themselves is presented, and personal data for which platforms have been granted permission are not included in this platform.

Another issue with social media data is the presence of location information. However, this social media platform can provide location data. Coordinates are extracted from the text and visualised on maps, thus addressing this problem in the current landscape of social media data analysis.

Decision Support Tool

A decision support system proposal has been outlined for the allocation of temporary disaster response facilities in the context of uncertainty in demand. The proposed system is designed to be flexible and to accommodate various scenarios and cases. A robust database is developed to efficiently store and retrieve all related details. In addition, a comprehensive stochastic optimisation-based decision engine is implemented, considering real-world problem characteristics.

The architecture of the C2IMPRESS Decision Support Tool (DST) for Policy Management[2] involves gathering social media data to analyse people's behaviour, aiding policymakers in making evidence-based decisions before, during, and after disasters. The Camunda Modeller is used to develop BPMN (Business Process Model and Notation) for processes like the warning system after a river overflow and strong winds. Each task is assigned to a specific user or group, and the process sequentially flows as tasks are completed.

2 This project is funded by the European Union under the Horizon Europe grant 101074004 (C2IMPRESS).

The user interface is designed to be user-friendly, allowing users to track their tasks easily and comprehend the status of their business processes. Big Data Visualisation and Dashboard Development have been implemented, employing Kibana dashboards to provide real-time insights from social media data. These dashboards offer a comprehensive overview of trends, sentiment analysis, and relevant metrics, enabling users to monitor developments as they unfold.

Methodology

The method of the study is based on a literature review to examine the theory and practice, as well as a a case study designed to measure the willingness of municipalities to use innovative social media and decision support platform tools. For this purpose, the Istanbul Metropolitan Municipality (IMM) was selected, and a survey was conducted. Descriptive analyses were used to analyse the survey results.

The research question of the study is as follows: "How do municipalities perceive the adoption tendencies and impacts of a social media platform and Decision Support Tool (DST) that combine social media data for collection, analysis, and utilisation in decision-making processes?" This study investigates the potential use of social media data and DST data in the case of the Istanbul Metropolitan Municipality (IMM).

Within the scope of the C2IMPRESS project, a social media and decision support platform was designed. This article aims to explore the dissemination and potential use of these platforms.

Case Study

Istanbul is located in the Marmara Region and covers an area of 5,196 km². The population of the city was 15,655,924 in 2022. Istanbul Metropolitan Municipality (IMM) has a unit called the Disaster Coordination Centre (AKOM) in addition to the Disaster Affairs Directorate. IMM not only leads emergency and disaster response plans but also plays a key role in significant initiatives such as the Istanbul Earthquake Master Plan and the Istanbul Disaster Prevention and Reduction Basic Plan. The municipality of Istanbul, Türkiye's most populous city, serves as a good example for potential research on the use of such innovative tools, given that it is also at risk of disaster.

Data Collection Tools

The data collection tool used in the case study was a questionnaire. Questionnaires were directed to 9 Directorate General and 37 Branch Directorates via Google Forms. In total, 133 individuals from these units responded to the surveys.

Process

SPSS (Statistical Package for the Social Sciences) is a widely used software package for statistical data analysis. SPSS provides researchers with various tools for data analysis, data management, and statistical reporting. Descriptive analysis describes the characteristics of a dataset. This type of analysis provides information about central tendency measures (mean, median, mode), variability measures (standard deviation, variance), and dataset distribution. SPSS provides tools to perform such analyses and presents outputs in the form of graphs for visualisation.

In this study, IBM SPSS Statistics 22 software was used. Frequency analysis was conducted as part of the descriptive analysis. Tables and graphs were created to visualise the results. The findings of the data collected through surveys are explained under the "Findings" section.

Findings

A total of 133 individuals participated in the survey sent online to a total of 46 units within the Istanbul Metropolitan Municipality (IMM). Of the 133 participants, 36.8% (49 people) were female, 60.2% (80 people) were male, and 3% (4 people) chose not to specify gender. The distribution of age ranges was as follows: 2.3% (3 people) aged 19-24, 20.3% (27 people) aged 25-34, 40.6% (54 people) aged 35-44, 33.8% (45 people) aged 45-54, and 3.0% (4 people) aged 55-64. The analysis of participants' educational backgrounds is as follows: 65.4% (87 people) were high school graduates, 19.5% (26 people) were associate degree holders, 11.3% (15 people) were bachelor's degree holders, and 3.8% (5 people) were graduate degree holders.

In the scope of the survey, participants were asked about their areas of expertise. Predefined professions related to disasters were identified for this question. Within this scope, the defined professions include: Emergency Manager, Search and Rescue Team Member, GIS Specialist, Doctor, Nurse, Other healthcare personnel, Electrical-electronics Engineer, Energy Engineer, Civil Engineer, Fire Department Personnel, Geological Engineer, Geophysics Specialist, Public Administration Specialist, Mechanical Engineer, Architect, Psychologist, Urban Planner, Social Media and Communication Specialist, Social Services Specialist, Telecommunications Engineer, Transportation Engineer, Disaster Management Specialist. Out of 133 individuals, 42.9% (57 people) belonged to these professional groups, whereas 57.1% were from other professional groups.

According to the table below, in the event of a disaster, the majority of participants work in units related to Istanbul Metropolitan Municipality's disaster management and coordination efforts. Of the participants, 52.6% stated that their units always participate in these efforts.

Table 1
Disaster Management and Coordination in IMM Units

In the event of a disaster, does the unit in which you work within IMM work in disaster management/coordination with IMM AKOM?					
		Frequency	**Percentage**	**Valid percentage**	**Cumulative percentage**
Valid	Not working	23	17.3	17.3	17.3
	Rarely working	19	14.3	14.3	31.6
	Often working	21	15.8	15.8	47.4
	Every time	70	52.6	52.6	100.0
	Total	133	100.0	100.0	

According to the table below, in the event of a disaster, nearly half of the participants (45.9%) indicated that their unit, along with Istanbul Metropolitan Municipality (IMM), İBB AKOM, and AFAD, is always involved in emergency preparedness plans. 21.8% stated that they frequently participate in these activities.

Table 2
Emergency Plan Development Coordination Among IMM Units, IMM AKOM, and AFAD Provincial Directorates

In case of a disaster, does the unit in which you work within IMM work together with other units affiliated with IMM, IMM AKOM, and the AFAD Provincial Directorate to develop an emergency plan?					
		Frequency	**Percentage**	**Valid percentage**	**Cumulative percentage**
Valid	Not working	21	15.8	15.8	15.8
	Rarely working	22	16.5	16.5	32.3
	Often working	29	21.8	21.8	54.1
	Every time	61	45.9	45.9	100.0
	Total	133	100.0	100.0	

According to the table below, when there is no disaster, nearly half of the participants (42.9%) indicated that their unit, along with Istanbul Metropolitan Municipality (IMM), İBB AKOM, and AFAD, is always involved in disaster-related work and processes. 23.3% stated that they frequently participate in these activities.

Table 3
Collaboration on Disaster Management Subjects among IMM Units, IMM AKOM, and the AFAD Provincial Directorates

During periods in which there is no disaster, does the unit in which you work within IMM work together with other units affiliated with IMM, IMM AKOM, and the AFAD Provincial Directorate on disaster management subjects?					
		Frequency	**Percentage**	**Valid percentage**	**Cumulative percentage**
Valid	Not working	22	16,5	16.5	16.5
	Rarely working	23	17.3	17.3	33.8
	Often working	31	23.3	23.3	57.1
	Every time	57	42.9	42.9	100.0
	Total	133	100.0	100.0	

64.7% of the participants (86 individuals) stated that both the social-media platform and DST would assist in the processes during and after disasters in the municipality's conducted activities. 9% found DST useful, while 12.8% believed that the social-media platform would be beneficial.

Table 4
Utilisation of Decision Support and Social Media Platforms in IMM Disaster Management Processes

Do you think it would be beneficial to use a decision support and/or social media platform in the disaster management processes carried out within IMM during and after a disaster?					
		Frequency	**Percentage**	**Valid percentage**	**Cumulative percentage**
Valid	I don't consider it beneficial.	18	13.5	13.5	13.5
	I consider DST beneficial.	12	9.0	9.0	22.6
	I consider the Social Media Platform beneficial.	17	12.8	12.8	35.3
	I consider both platforms to be beneficial.	86	64.7	64.7	100.0
	Total	133	100.0	100.0	

The following 3 tables are related to volunteer-based participation. A total of 39.8% of survey participants stated that they did not participate in disaster coordination teams on a voluntary basis. 23.3% (31 individuals) indicated that they always participated in these activities.

Table 5
Individual Volunteer Participation in Disaster Coordination Teams

Do you participate in disaster coordination teams on an individual volunteer basis?					
		Frequency	**Percentage**	**Valid percentage**	**Cumulative percentage**
Valid	Not participating	53	39.8	39.8	39.8
	Rarely participating	37	27.8	27.8	67.7
	Often participating	12	9.0	9.0	76.7
	Every time	31	23.3	23.3	100.0
	Total	133	100.0	100.0	

The following table is related to participation in processes involving citizen roles in disaster planning and management during and after disasters. 18.8% (25 individuals) stated that they always participated in these activities. 36.1% (48 individuals) indicated that they never participated in these processes.

Table 6
Citizen Participation in Disaster Management and City Planning Processes

Do you participate in participatory processes in the development of disaster management and emergency disaster plans and city plans, carried out during and after a disaster, with the role of a citizen, based on individual volunteering?					
		Frequency	**Percentage**	**Valid percentage**	**Cumulative percentage**
Valid	Not participating	48	36.1	36.1	36.1
	Rarely participating	49	36.8	36.8	72.9
	Often participating	11	8.3	8.3	81.2
	Every time	25	18.8	18.8	100.0
	Total	133	100.0	100.0	

69.2% (92 individuals) stated that disaster response processes carried out on a voluntary basis (by associations, civil society organisations, initiatives, excluding official institutions) during and after disasters would benefit from both DST and social media platforms. 12.8% indicated that social media platforms would benefit, while 8.3% stated that DST would benefit.

Table 7
Utilisation of Decision Support and Social Media Platforms in Individual Volunteer Disaster Management Processes

Do you think it would be beneficial to use a decision support and/or social media platform in the disaster management processes carried out during and after the disaster in which you participated on an individual volunteer basis?					
		Frequency	**Percentage**	**Valid percentage**	**Cumulative percentage**
Valid	I don't consider it beneficial.	13	9.8	9.8	9.8
	I consider DST beneficial.	11	8.3	8.3	18.0
	I consider the Social Media Platform beneficial.	17	12.8	12.8	30.8
	I consider both platforms to be beneficial.	92	69.2	69.2	100.0
	Total	133	100.0	100.0	

Discussion

The survey results indicate that the use of DST and social media platforms has potential in disaster-related practices. These technologies play an effective role in information gathering, sharing, and coordination during disasters. In particular, DST provides a practical facilitative application for damage assessment and rescue operations in disaster areas. Similarly, social media platforms that allow multiple social media data to be displayed and analysed together can speed up processes and increase efficiency by facilitating actors' access to real-time information, requesting assistance, and ensuring the delivery of aid. Therefore, the integration of DST and social media platforms into disaster management processes should be considered an important strategy to ensure an effective and rapid response.

The findings of this study show that DST (Decision Support Tools) and social media platforms make significant contributions to disaster management processes and that the platforms have potential for use by local governments. However, this study also has some limitations and various suggestions can be offered for future studies.

First of all, the study was limited only to Istanbul Metropolitan Municipality (IMM) and therefore the generalization of the findings is limited. It is important to expand the scope of the study and conduct similar research with different public institutions to evaluate the potential use of DST and social media platforms in a broader perspective. Future studies could examine the effectiveness of DST and social media platforms in different specific types of disasters. For example, investigating how these technologies function in different disaster scenarios such as earthquakes, floods or fires will provide

more comprehensive information for improving disaster management processes. Additionally, different disciplines should examine the social and psychological effects of the public use of these technologies. The psychosocial consequences of strengthening social solidarity or increasing access to information after a disaster may be important topics for future research.

The use of DST and social media platforms in disaster management by local governments should be evaluated not only from a technical perspective, but also from its social and economic dimensions. In terms of social benefit, it is seen that these technologies contribute to rapid and effective organization by accelerating the post-disaster information flow. The use of DST and social media platforms can provide cost-effective solutions in disaster management processes. These technologies enable post-disaster response and recovery efforts to be planned and carried out more efficiently, allowing more effective use of resources. However, the integration costs and sustainability of these technologies must also be taken into account. Future studies can guide decision-making processes for municipalities and other relevant institutions by conducting cost-benefit analyzes of these technologies.

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