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RESEARCH ARTICLE

Emerging citizen digital networks in the face of the climate crisis. Radiography of Solidarity Initiatives in the Valencia DANA flooding catastrophe 2024

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ABSTRACT: This study analyses the communicative resilience in Valencian society after the catastrophe caused by the dana on October 29, 2024, which resulted in 228 victims. In the absence of institutional response, alternative citizen-driven communication channels emerged, allowing the rapid dissemination of information and the organization of aid. These initiatives represent a model of social innovation based on digital cooperation and mobilization through social networks and digital platforms. The research focuses on the analysis of 22 initiatives with the greatest social impact that structured their response in two phases: emergency and reconstruction. A mixed methodology based on a detailed survey of each initiative and Social Network Analysis (SNA) is used to study the interaction between them. The results show that citizens organized themselves collectively or individually and created faster and more effective communication networks than institutions, demonstrating the potential of digital activism during episodes of climate crisis. Moreover, this phenomenon has generated new narratives on climate change, moving away from catastrophism to focus on solidarity and community action, through community support strategies and post-emergency reconstruction assistance.

KEYWORDS: Citizen networks, Climate change, Communicative resilience, Dana, Digital activism

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1. Introduction

The environmental catastrophes that have occurred largely as a result of climate emergencies have highlighted the need for a quality communication model both at the time of the emergency, to prevent risks, and to facilitate recovery.

On October 29, 2024, a storm train caused by an isolated depression at high levels (dana) caused a series of floods, mainly in the province of Valencia (Spain), which resulted in 228 deaths and millions in material losses. The warning and prevention services were not properly interpreted by the decision-makers and more than 80 municipalities were left in an emergency situation for several days, without electricity, water or communications. Ground zero of the episode covers 15 towns with more than 270,000 inhabitants.

Climate change is affecting the intensity and frequency of droughts in a territory, the Valencian region, which historically suffers from flooding (Camarasa 2020; Pérez et al. 2021). The virulence of this dana in the south of the metropolitan area of Valencia is also explained by the fact that it is a highly urbanized territory (Gallegos Reina 2022), with a high population density and industrial and tertiary spaces that are extraordinarily dependent on the communication infrastructures with the capital and with the exterior. Urban growth in the last five years, without taking into account the risk of flooding of the wadis and ravines that cross it, has increased the impact (Vargas et al. 2022).

During the first hours of the tragedy, the affected population felt a clear informational vulnerability, no longer about the causes of what had happened, but about what to do and how to move forward. The situation was perceived as chaotic, largely due to the lack of clear instructions from the government or institutions, but also because of the informational disorder (Torres-Romay 2024), although the role of the media as a public service was noteworthy, rigorously fulfilling the informative role that should have been carried out by the government (Moreno Castro 2025).

At that first moment, civil society organized itself quickly to respond to the needs of the citizens. The action at the time of the emergency was communicated through social networks and communication technologies in a direct way, among neighbours, in the style of a digital word-of-mouth. The traditional media, which provided good news coverage from before the alarm, focused on general information about the catastrophe. It was the citizens who, as in other similar disasters, took the initiative to generate communication and help to those in need, mainly due to the lack of state presence (Cutter et al. 2008; Chamlee-Wright and Storr 2009; Shults et al. 2021).

In this context, a multitude of solidarity initiatives are spontaneously configured based on the trust they generate through social networks, either because they already had a previous social recognition, or because they target neighbours, relatives and friends who guarantee the dissemination of the initiative and trust in it at a time of communication uncertainty. The appearance of fake news, trolls and constant interruptions of the internet service created enormous confusion during the first hours of the emergency (López Marcos et al. 2025), taking into account the pre-eminence of social media in the media ecosystem (Bennett and Livingston 2023) and the risk of fake news linked to climate change or natural disasters for the creation of informed public opinion (Calvo et al. 2022; Palau-Sampio et al. 2024, Hilberts et al. 2024; Calvo et al. 2025). As a result, fact checkers quickly uncovered the hoaxes about the storm (EFE Verifica 2024; Newtral 2024; Maldita 2024). Even the judge in Catarroja, Nuria Ruiz Tobarra, who is investigating the case has warned of the danger of misinformation (El País 2025).

These solidarity initiatives have spontaneously contributed to the emergence and development of the communicative resilience of Valencian society in the face of the catastrophe generated by the floods. The

communication carried out by the citizens organized to act from the first moment of the emergency has served to inform, interact and help the affected people. This solidarity response has gone beyond the regional and national level to reach an international dimension.

This research explores the communicative resilience of Valencian society through the study of citizen movements associated with the Valencia dana. For this purpose, an analysis of 22 citizen solidarity initiatives of different typology has been carried out. The importance of this work lies in the combination of the analysis of the communicative strategies developed by these initiatives in a moment of general communicative disorder caused by a climatic disaster (communicative resilience), their capacity to respond to the specific needs of the citizens (social innovation) and the emergence and consolidation of informal social networks through the use of new information technologies (social capital).

The following sections analyse the theoretical and empirical context on which this study is based, focusing on citizen initiatives that appeared during the emergency caused by the dana in Valencia (October 2024–Summer 2025). Although there is no previous research from this specific perspective, we present the methodology based on a survey completed by the main solidarity initiatives active during this period. The results characterize the profile of these initiatives, their development of social capital and the communicative narratives generated. The conclusions point to the emergence of an alternative communication driven by citizens, more agile and reliable than the institutional one in the early stages, which allowed a quick and effective response to channel solidarity and urgent aid.

2. State of the art: Environmental crises and social capital under the digital paradigm

Natural disasters, in addition to causing physical damage, generate profound social consequences, as the UN has recognized since the late 1980s. The magnitude of their impact depends on the social capacity to prevent and recover. In this sense, several studies highlight the key role of organized citizenship in territorial management and immediate disaster response, as well as in the generation of reliable information for society in times of uncertainty (Cutter et al. 2008; Aldrich 2012; Martínez-Palacios and Bárcena 2013).

With globalization and digital technologies, crises have become more visible, encouraging autonomous solidarity responses. In particular, climate catastrophes have attracted a great deal of research attention, given their increasing frequency and magnitude. In scenarios marked by disinformation and institutional absence, digital journalism has gained prominence (Salaverría 2019; Fernández-Castrillo and Magallón-Rosa 2023), and citizens have found new forms of participation through technology (Howells 2024). This "global communication" allows a rapid circulation of citizen narratives that make up for institutional slowness fundamentally in the first moments of emergency after a catastrophe (Shuls et al. 2021).

The present research is situated at the intersection of three key paradigms:

- a) the communicative resilience of social movements,
- b) social innovation as a response to the shortcomings of the State and the market,
- c) social capital based on mutual trust and relational cooperation.

These dimensions have been fundamental for informing, interacting and rescuing during the crisis, especially in its initial phase. Regarding the first, it should be noted that the digital environment has profoundly transformed journalism (Meyers 2012), questioning its traditional intermediary role and promoting new models based on hypertextuality, interactivity and multimedia (Scolari 2008; Salaverría 2009; Masip et al.

2010; Martori-Muntsant 2023). However, it has also brought risks such as disinformation (McDougall 2019; Arcos, Rosso and Salaverria 2025), *infoxication* (López-González et al. 2023), and audience fragmentation (Quintas and González 2015; Arjona Martín 2021).

The EESC (2016) has pointed out the importance of digital communication in strengthening participatory democracy. This combination with social innovation empowers citizen action, but also presents challenges such as the need for trust, security and adequate ethical frameworks. Despite its apparent openness, digital communication is mainly channelled through networks of trust.

International institutions have recognized the relevance of citizen initiative, especially with the democratization of communication. Social innovation, has been a powerful tool to transform social structures through creative and collective responses (Salom et al. 2017; Salom and Pitarch 2018). Its success depends largely on the institutional environment, particularly the role of local government, which can facilitate collaborative networks, spaces for co-creation and continuity (Zuluaga-López 2015; Eizaguirre and Klein, 2020; Klein and Pitarch 2020). The structural transformation of citizen initiatives can consolidate new forms of governance and consolidate democracy by giving the population a greater decision-making capacity over public policies (Klein and Tremblay 2016).

Innovative citizen initiatives with the greatest impact are those that are embedded in diverse and cooperative local ecosystems, being highly context-dependent (Moulaert and Mehmood 2020). The institutionalization of these initiatives is achieved through collective actions that promote new forms of organization and strengthen social capital. The generation and consumption of information by citizens plays a fundamental role both internally among its members and in the creation of image and reliability to the outside world.

Social capital, according to Putnam (2000) and Wasserman and Faust (2013), has expanded with ICTs, which have modified human relationships and social cohesion processes. Digital social networks have proven to be effective in generating links, reducing social distances and facilitating access to information (Vitak and Ellison 2013). They have also enabled the creation of transnational social capital, facilitating global cooperation.

However, it has been debated whether civic engagement is a cause or a consequence of social capital. Gil de Zúñiga and Iguanzo (2022) argue that civic engagement precedes social capital. In crisis contexts, factors such as speed, institutional weakness and focus on specific needs are key to the success of citizen initiatives, which, although ephemeral, generate and consolidate social capital based on trust.

The analysis of more than twenty solidarity initiatives in this study shows a digitally mediated model of social innovation, capable of articulating cooperative networks with a strong narrative charge. These narratives, far from catastrophism, have been built by citizens through new forms, such as *storytelling* (Scolari, 2008), positioning themselves as service and information referents in a context marked by the climate emergency.

3. Methodology

3.1 Data display and collection

This research combines methodologies of a qualitative and quantitative nature to analyse the object of study with the aim of optimizing the results of the study thanks to complementary and integrative perspectives, defined as cognitive pluralism (Igartua 2006; Corbetta 2010; García Ferrando et al. 2015).

The different phases of the methodology used are as follows:

- a) In order to learn about the emergence, interrelation and communication between the different solidarity initiatives, firstly, a list of 32 solidarity initiatives that had played a significant role during the Dana of October 29th was defined. For this purpose, a consultation was carried out through social networks and the Internet using keywords such as: DANA, solidarity, ayudaVLC, Valencia or 29O, among others, to identify those initiatives that were most relevant and had the greatest presence. In addition, the initiatives that appeared most frequently in regional and national newspapers were selected, such as: *Levante-EMV*, *Las Provincias*, *Diario.es*, *El País*, *El Confidencial*, etc. However, despite having a starting list of 32 initiatives, within the questionnaire there was a section where the initiatives could include whether they collaborated and/or participated with others that had not been selected; in this way, if the initiative was recognized by more than three initiatives, it would be included and the survey would be sent to them for their response.
- b) Secondly, a questionnaire of open and closed questions was designed to carry out an anonymized survey of all the initiatives detected. *LimeSurvey* software was used, licensed by the Universtat de València in order to create an easily accessible form and guarantee the conservation of the results in the university servers, preserving data protection according to national and European regulations, despite the fact that in no case is personal information used and the information collected from the initiatives is used only for scientific purposes. The questionnaire consists of three main sections:
 - Presentation of the solidarity initiative and its creation: in which open-ended questions were asked about the moment of creation and how, if there was a previous entity or not, and the problem to which it was trying to respond.
 - Communication strategy of the initiative: the aim was to analyse the form of communication used through social networks, type of content, alternative communication channels or trust in the media. For this purpose, closed-answer multiple-choice and/or scaled questions were used.
 - Creation and interaction of networks with other initiatives: knowledge of other initiatives, trust and collaboration among them were analyzed in order to see their interaction and, therefore, the stock of social capital. From the list of initiatives, dichotomous closed questions were asked about knowledge, trust or collaboration, or not, of that initiative with others.

The questionnaire was distributed between 16/01/2025 and 02/04/2025 to the different initiatives via official email and/or the communication section available on the website. However, questionnaires and reminders were also sent via the initiatives' official social media accounts. The questionnaire was addressed to the initiative's communications manager, who in most cases was also the founder, especially in those initiatives that had emerged spontaneously.

- c) The survey was completed by a total of 22 solidarity initiatives (68.75% of the total), which were contacted individually between January and March 2025 (Table 1). A first characterization of these initiatives shows that 34.88% of them were intended for emergency purposes, compared to 65.12% for reconstruction. Moreover, 47.75% of the initiatives were launched by a previous entity (association, company, foundation, etc.), while 56.25% of the initiatives were created "*ad hoc*", spontaneously, to cope with the emergency.
- d) At the same time, we apply framing theory (Ardèvol-Abreu 2015) to gain an in-depth understanding of the narrative frameworks in which digital activism has developed, selecting the more representative social networks of the studied profiles.

Table 1 – Analysed solidarity initiatives

| <i>Name of the Initiative</i> | <i>Previous entity to which the initiative is linked</i> | <i>Initiative main purposes</i> | <i>Problem they are trying to solve</i> |
|--|--|---------------------------------|---|
| Adopta un comercio | None | Reconstruction | Trade |
| Alcem-se | Marina de Empresas | Reconstruction | Financial assistance |
| Alcem-se Esport | Trinidad Alonso Foundation | Reconstruction | Sports Clubs |
| Alerta DANA | Pucelabits (Valladolid) | Reconstruction | Documenting the catastrophe |
| Anem! by GuruWalk | GuruWalk | Reconstruction | Mobility |
| AyudaDANA.com | None | Emergency | Volunteer coordination |
| AyudaTerreta | None | Emergency | Information on procedures |
| Bicis contra el lodo | Doyoubike | Reconstruction | Mobility |
| Buscador DANA | Vorágine - Design | Emergency | Information on initiatives |
| Ciclogreen – Car Sharing | University of Valencia | Reconstruction | Mobility |
| DanaKids | None | Emergency | Childhood |
| Hidro-Alerta | None | Reconstruction | Flow and precipitation information |
| Goro-Goro (Lost pets platform) | Gorogoro | Emergency | Domestic animals |
| Proyecto Alicia | None | Reconstruction | Furniture |
| Reamuebla.org | None | Reconstruction | Furniture |
| Salvem Les Fotos | University of Valencia | Reconstruction | Heritage |
| SOS Conecto | None | Reconstruction | Housing (affected and volunteers) |
| Suport Mutu Dana Valencia | None | Reconstruction | Organization of assistance |
| #SeràHortaSud | Horta Sud Foundation | Reconstruction | Assistance to local associations |
| Tucochedana.es | None | Reconstruction | Location of cars |
| Valencia Comparte Coche - Ayuda DANA | Hoop Carpool | Reconstruction | Mobility |
| World Central Kitchen - Chefsforvalencia | NGO WCK | Emergency | Feeding |

Source: own elaboration based on the survey

3.2 Analysis techniques and research objectives

Based on the information collected, different analysis techniques were applied. On the one hand, an analysis of the discourse of the initiatives was carried out using Atlas.ti 8 software, by coding the narratives presented in the open-ended or free-form questions. On the other hand, for the Social Networks Analysis (SNA) and the stock of social capital of the initiatives linked to knowledge and collaboration among them, the UCINET and Gephi software were used. For the coding of relational responses, the data were transformed in Excel using a square matrix of absence (0) and presence (1) of relationships, which was then incorporated for subsequent analysis in the Gephi and UCINET software. Within the SNA method, the main indicators have been studied, such as: density, degree of entry, degree of exit, reciprocity, etc. (Serrano and Esparcia 2023). As well as the graphs for the representation of the relationships between initiatives.

Finally, the communication model developed by some representative initiatives has been studied based on the answers given to the survey, but also on the analysis of the information and interactions of these initiatives on social networks. A sample consisting of 20 posts from each of the initiatives was chosen, 10 at the time of the emergency, from October 29, 2024, and another 10 at the time of reconstruction in descending chronological order, from February 28, 2025. In total, a sample (N=100) publications in IG feed, however, one of the analyzed initiatives presents less activity during the reconstruction period, so the final sample is N=93.

As for the main limitations of the study presented, we can highlight the difficulty of identifying solidarity initiatives at a time still very close to the disaster. Initiatives that arise at the time of the emergency begin to withdraw when it ends, giving way to reconstruction initiatives, most of which are managed by the government at different levels. The initiatives were identified through their social media or websites, where they provided information to the public. Each initiative has been monitored individually, contacting its managers and requesting their collaboration in the study. The initiatives contacted have provided the names and contact details of other similar initiatives, thus expanding the network. The most notable weakness is that some of them, particularly those that have worked at the local or neighbourhood level, have not been detected because their communication networks have been more personal and smaller in scope. Despite this, the response has been very significant, and the results of this research are therefore considered to be representative of the reality experienced in the first six months after the disaster.

The research plans to answer five questions:

- Q.I.1. What type of citizen initiatives arise in times of disaster and for what purpose? Are there differences between the reasons, objectives and models (emergency or reconstruction)?
- Q.I.2. What communication objectives do they have and what channels do they use?
- Q.I.3. What level of knowledge/recognition do they have among themselves and what is the stock of social capital they have or develop?
- Q.I.4. What level of credibility do the social initiatives that emerged during the catastrophe give to the information provided by the institutions on the data?
- Q.I.5. The surveys show that the initiatives favored the use of social networks for communication and aid promotion despite the reliance on conventional media. Which narrative frames were the most prominent?

The main results of the research are presented below in response to the questions posed above.

4. Results: The value of solidarity and trust in situations

The 22 initiatives analysed in this research begin to act on the Valencian territory in response to the passage of the dana on October 29, 2024. All of them focus their activity on alleviating the consequences of the floods in the Valencian Community. Their final objective is diverse, such as recovering mobility, rescuing affected heritage, facilitating access to food and water, reporting incidents, helping specific groups, such as sportsmen, etc. All of them appear in the first days of the catastrophe and approximately half of them do it spontaneously, without depending on any previous institution or organization.

Next, we will briefly describe the solidarity initiatives and the discourse model they use, and then focus our analysis on the role played by communication and social capital in their success and sustainability.

4.1 Description of solidarity initiatives in response to the consequences of the Valencia drought (P1.1)

The analysis of the solidarity initiatives that emerged after the hurricane in Valencia in October 2024 reveals the central role of citizens as autonomous management agents in emergency contexts. In the face of institutional inaction or slowness, several initiatives were able to organize themselves quickly, with or without previous structures, to cover urgent needs. Examples such as *Salvem les Fotos*, with a university base and

inter-institutional collaboration, or *Reamuebla.org* and *Proyecto Alicia*, which emerged in a self-managed manner, show how citizens can generate agile responses through networks of trust and direct action.

Initiatives such as *Suport Mutu* or *Alcem-se Esport* exemplify the capacity for coordination between groups and specific sectors, such as sports, through the creation of brigades or census of needs. In parallel, others such as *Buscador DANA* arose to centralize and organize the flow of citizen actions, demonstrating the need for articulation between multiple solidarity proposals.

The relationship between these initiatives and public administrations was ambivalent. While some, such as *Salvem les Fotos*, achieved effective institutional collaboration, others encountered serious difficulties, denouncing bureaucratic obstacles, lack of open data or contempt for their promoters. This situation forced many initiatives to seek alternative paths, relying on citizens or the private sector to operate efficiently.

In terms of perceived impact, most of the initiatives rated their social impact positively, both in material and emotional terms. *World Central Kitchen*, *Adopta un comercio* or *tucohedana.es* achieved wide visibility and recognition, while others, such as *DanaKids*, offered psychological support to affected minors. However, some initiatives with less visibility, such as *SOS Conecto*, acknowledge limitations in their scope, especially due to lack of time, means or infrastructure.

All the initiatives were activated in the first days after the catastrophe, and many have continued to operate in the reconstruction phase. This is not limited to material aspects, but also includes emotional support, especially for children, as shown by the testimony of *DanaKids*. The emotional dimension of the catastrophe was thus incorporated into civil society's action strategies.

Finally, the high level of collaboration between projects stands out. Initiatives such as *AyudaDANA.com*, *AyudaTerreta* or *Alerta DANA* established synergies with organizations such as *Hambre Cero*, *OpenStreetMap*, universities or foundations. This collaborative network strengthened the social capital generated by the citizen response, by integrating diverse resources in a collective and coordinated action. Taken together, these experiences demonstrate the capacity of citizens to generate efficient aid and communication structures in crisis contexts, enhancing social and communicative resilience from the local level.

4.2 Brief analysis of the discourse of solidarity initiatives (P1.1)

The analysis presented here is based on the responses to the survey conducted and not on the message sent by the solidarity initiatives through their websites or social networks. In the answers to the questions posed in this research we can find the basic messages that were the basis of their success: trust, participation, thoroughness, good work and altruism.

In this sense, it should be noted that the predominant discursive tone is close and supportive, characterized by the frequent use of the first person plural. Expressions such as "we launched the initiative", "we decided to act" or "we set up a network", etc. show a collective commitment and reinforce group identity.

Four types of discourse are identified: the emotional, the inspirational, the institutional and the community discourse (table 2).

The semantic analysis reveals the presence of lexical fields associated with help, memory, protection and joint action. terms such as "rescue", "support", "accompany" and "rebuild" are recurrent, which reflects a narrative centred on repair and care. Metaphors play a key role: "reaching out" and "setting in motion" evoke dynamism and proximity, just as expressions such as "rescuing memories," "returning to an empty house," underscore the emotional dimension of material loss.

Table 2- Type of discourse

| Type of discourse | Main characteristics | Examples from the sirve |
|-------------------|--|--|
| Emotional | Emphasises the affective dimension; expresses feelings and empathy. | “We were deeply impacted by the situation”, “We wanted to be by the side of those in need” |
| Inspirational | Uses mobilising metaphors to motivate and generate hope | “Solidarity can move mountains”, “Rescuing memories so as not to lose identity” |
| Institutional | Formal and descriptive language; presents structured actions | “The Foundation developed a structured plan to support affected entities” |
| Community | Highlights the relational and horizontal dimension; emphasises collective organisation | “We went house to house collecting needs”, “The community organised itself spontaneously” |

Source: own elaboration based on the survey.

The common narrative structure follows a scheme of problem identification, solidarity action and expected result. It starts with the confirmation of the emergency ("the images shocked us"), describes the response ("we set up a platform") and closes with an invitation to collaborate or a reflection on the impact achieved.

The contrast between discourses linked to entities with a long history of support and solidarity (NGOs, companies...) and those of spontaneous entities is clear: the former emphasize organization, planning and monitoring; the latter, proximity, spontaneity and direct action. However, both converge in the legitimization of solidarity as a central value. The combination of both types of registers enriches communication and contributes to strengthening social confidence and, therefore, the success of the initiative.

4.3 Digital communication: use of social networks for organized citizen action (P1.2)

The initiatives studied are a good example of an emerging phenomenon: digital volunteering as an agile and effective response to disasters. Many initiatives are born from the ability of citizens to organize themselves through technology, without relying on traditional structures. Examples include *AyudaDANA.com*, *Alerta DANA*, *tucochedana.es* or *Reamuebla.org*, all of them initiatives that generate platforms that connect supply and demand for help.

Communication through digital media clearly contributes to the speed of the response. For example, in *AyudaDANA.com*, the creation of the platform took only three hours and its diffusion through networks is a case of immediacy in the response: "the reception was incredible". On the other hand, other initiatives, such as *Alerta DANA*, *Salvem les fotos*, *Alcem-se*, *Suport Mutu* or *DanaKids*, among others, rely on a large community of volunteers coordinating technical and field aspects, showing how collective intelligence and online cooperation make up for the lack of institutional resources: "It allows us to have thousands of eyes and reach where official resources cannot reach" (*Alerta DANA*), "It is the users themselves who self-manage the platform by adding content and validating them" (*Alerta DANA*), "The web was the first thing we launched with the map" (*AyudaTerreta*), "I decided to share my code with a larger group of volunteers" (*SOS Conecto*), "Instagram also gave us the opportunity to solve doubts or establish dialogues with people interested in what we were doing" (*Suport Mutu*). Another example is the *tucochedana.es* initiative, by a young man without institutional support who created and disseminated a platform to locate displaced vehicles. The viralization and participation of media and influencers are key: "the template spread more than expected and influencers began to repost it without even asking for it".

Digital volunteering arises from technically savvy citizens who apply their skills to an immediate social purpose. The ease of web development, the ability to communicate in networks and the design of accessible platforms are the basic elements that explain its success.

The responses to the survey show that most of the initiatives used social networks as a key communication tool, with Instagram and Facebook being the most used platforms. On *Instagram*, images and videos predominate, highlighting cases such as *Alerta DANA*, which mainly posted videos to show incidents and solutions in real time. For example, the initiative points out that on Instagram: "we publish geolocated videos to report damage and help points".

On *Facebook*, the content focused on explanatory texts and photographs, highlighting the *Bicis contra el lodo* initiative, which opted for texts and visual reports on the deliveries made: "in each delivery we document the smiles of the beneficiaries".

The use of *LinkedIn* is less widespread, but relevant for more institutional initiatives or those with a professional component, such as *Alcem-se Esport*, which published formal texts aimed at federations and sponsors: "we disseminate our reports and appeals to federations through LinkedIn". In contrast, the use of *TikTok* is anecdotal, with practically no presence, suggesting that communication prioritized platforms perceived as more serious or suitable for managing emergencies.

Most of the initiatives perceived high or very high interactions, especially during the first week after the emergency, when social and media attention was at its peak. For example, *AyudaDANA.com* reports a "very high frequency during the first week", which coincides with the viralization of its platform. *Likewise*, *tucochedana.es* indicated very high interactions "during the first month". Other initiatives such as *Anem*, *Reamuebla.org* and *Proyecto Alicia* also perceived high interactions during the first month, highlighting the persistence of interest in domestic reconstruction and exchange of goods: "queries and registrations skyrocketed in the first seven days and then dropped" (*Anem*). On the contrary, initiatives oriented to longer processes, such as *Salvem Les Fotos* or *Buscador DANA*, show a continuity in queries throughout the following month, showing that the nature of the service influences the temporality of the interaction: memory management or information gathering projects maintain their relevance beyond the immediate response.

Only a small group of initiatives indicated low or very low levels of interaction, associated with information saturation or the difficulty of standing out among the large number of solidarity proposals.

Although not all respondents used complementary channels, the use of Telegram and WhatsApp stands out for the immediate management of volunteers and the agile dissemination of messages. Initiatives such as *DanaKids* point out that "WhatsApp was fundamental to manage shifts and keep families informed".

The use of Telegram appears linked to organizational groups, as in *DANA Alert*, where a community of more than 40 volunteers coordinated actions and technical developments in real time.

4.4 Analysis of social capital and trust networks (Q2.1)

Having studied the form of communication and the response of the solidarity initiatives to the emergency, especially towards the citizens, it is now time to analyse the form of interaction and the creation of networks, that is, of community among the different initiatives that arose in response to the earthquake of October 29. To do this, we will work with the survey questions: Which of these solidarity initiatives do you know? and Which of these solidarity initiatives do you collaborate with? And, in this way, answer the second research question of this study.

networks present a quite positive clustering and proximity coefficient, since with only two contacts they can access the whole network, therefore it is very positive and it is important to highlight the interconnection between all the initiatives in a fast way and without great costs. Finally, the concept of modularity, which is the grouping of initiatives in different modules or clusters according to their strength and/or importance of the relationships between nodes, highlights as in the case of collaboration a value closer to 1 which is the reference value of the indicator, this means that in the collaborative network of these clusters are better established to achieve objectives together, which is very positive for future work between initiatives and if necessary to return to give answers in case of emergency.

Table 3- SNA indicators for knowledge and collaboration networks between solidarity initiatives

| <i>SNA Indicators</i> | Knowledge network | Collaboration network |
|------------------------------|--------------------------|------------------------------|
| Density | 22,2 % | 4,7 % |
| Degree In | 33,7 % | 11,8 % |
| Degree Out | 53,7 % | 65,0 % |
| Closeness ¹ | 8,2 | 3,4 |
| Betweenness | 11,31 % | 1,3% |
| Reciprocity (Dyad) | 12,2 % | 4,7 % |
| Clustering coefficient | 0,37 | 0,19 |
| Average length (small world) | 1,83 | 1,51 |
| Modularity | 0,133 | 0,273 |

Source: own elaboration based on the surveys carried out and UCINET and Gephi software. ¹ The result of the closeness is measured in the number of axes of separation.

If we group the initiatives between emergency and reconstruction, the level of knowledge is similar between them, both concentrating 50%; while in the case of collaboration it is similar, although 51% for emergency initiatives. However, if knowledge and collaboration are analyzed according to whether or not they had a previous entity, the result shows that those initiatives that did not have a previous entity have higher levels of knowledge (56.8%) and collaboration (55.3%) than those that did.

The 5 best known initiatives are: *Ayuda Terreta*, *World Central Kitchen (WCK)*, *Ajudadana*, *SOS-Valencia desaparecidos* and *ALCEM-se*, of which 3 of the 5 had no previous entity and 4 of 5 have been emergency initiatives. While the 5 initiatives with which they usually collaborate, more are: *Ayuda Terreta*, *World Central Kitchen (WCK)*, *ALCEM-se* and *Ajudadana*, with the majority being initiatives with no previous entity and emergency initiatives again. In addition, among the 5 best-known initiatives and those with which they collaborate most, they concentrate more than 1/3 of the prestige and recognition of the network, while among the top 10, more than 60% of the knowledge and collaboration is concentrated.

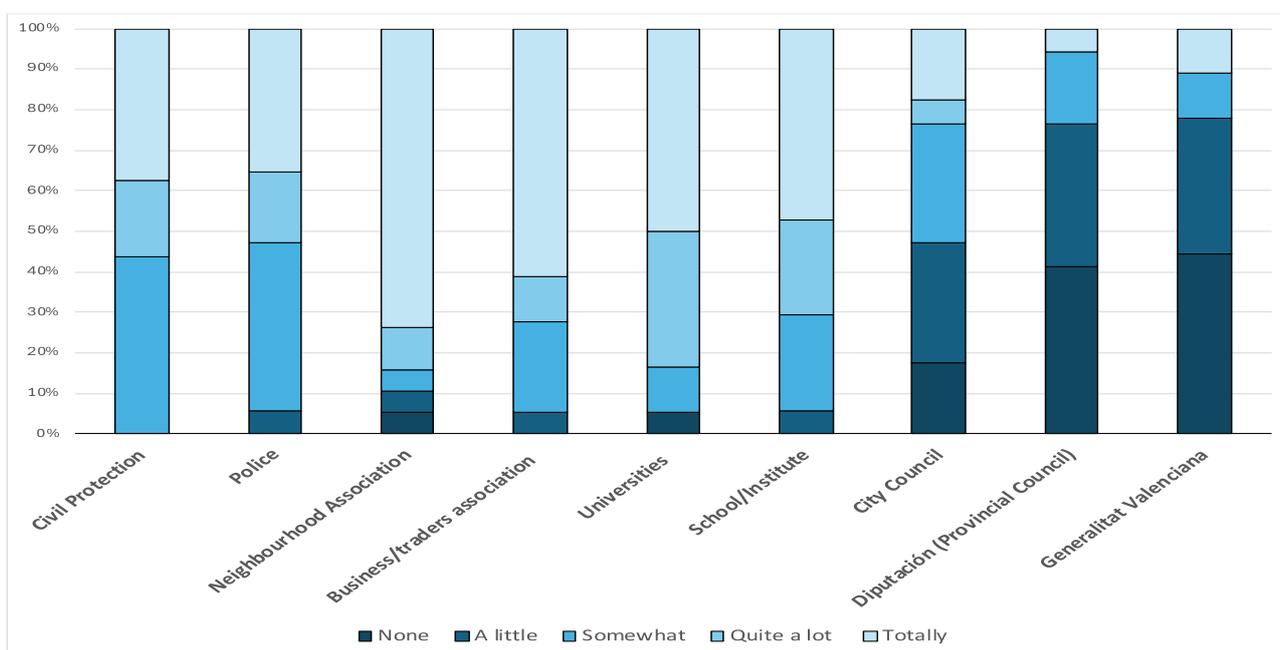
In short, based on the SNA, it has been possible to verify the correct and very positive functioning of the less traditional communication channels, which have allowed knowledge between newly created and already created initiatives. This highlights the great knowledge that exists between initiatives and the lesser collaboration between them. It has been possible to create a large stock of social capital among these solidarity initiatives and it is important to continue working on it, especially among these informal networks that were created ad hoc after the catastrophe. However, some of the initiatives are beginning to disappear, especially those initiatives linked to emergencies such as *Ayuda Terreta* or *SOS-Valencia Desaparecidos*, which is an important loss of social capital, being two of the best known initiatives and with whom most collaborate, which is a detriment to the networks and, therefore, to communication in future events/catastrophes.

4.5 Communication and citizen initiatives in times of emergency (P3.1)

As noted, in the days following the flood, the citizenry occupied the communicative space in the digital sphere, thanks to the potential of new technologies to articulate a model of social activism based on aid, also taking into account the crisis of the traditional media in its role of intermediation between current affairs and society.

The third research question focuses on the perception of the social initiatives studied regarding the credibility of the information provided by public institutions. The results of the surveys carried out show a low level of trust in local administrations. If we consider the lack of confidence or little confidence shown in the surveys, the regional government and the provincial council reveal a lack of confidence of between 80 and 90%, followed by the municipalities, which are close to 50% (Figure 2).

Figure 2. Trust in institutions according to solidarity initiatives



Source: own elaboration based on the survey

On the other hand, neighbourhood associations, business and trade associations and universities receive a higher credibility, from 50 to 80%, followed by security bodies such as the Police or Civil Protection, around 40%.

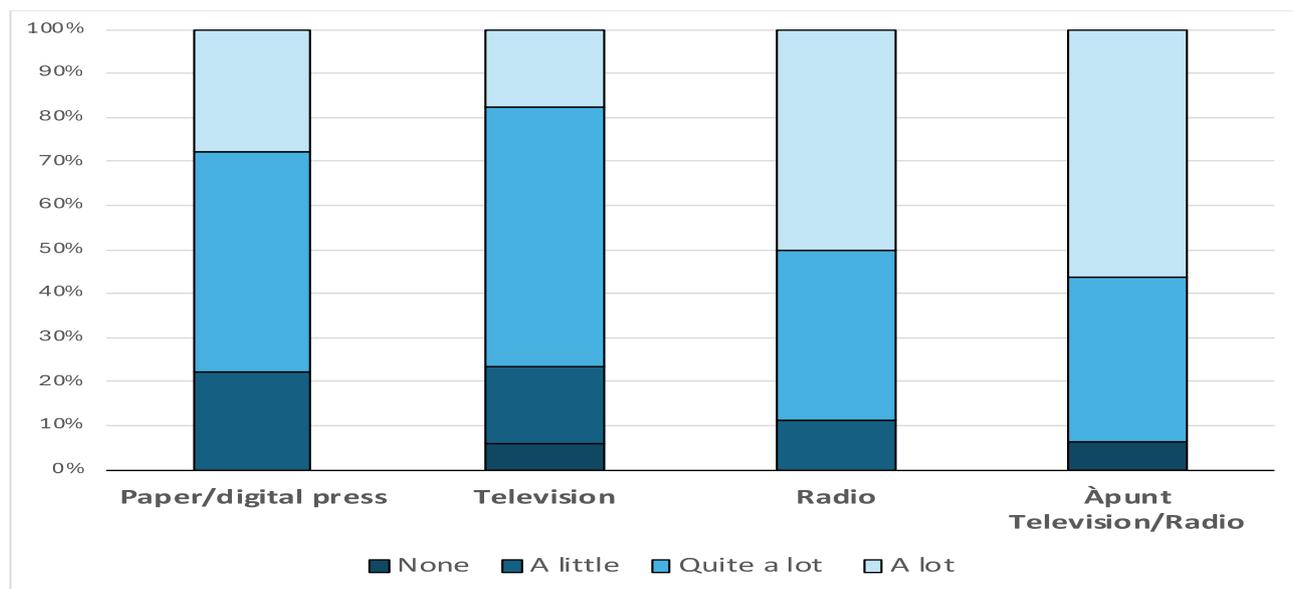
These figures of low confidence in public institutions are revealed as one of the causes of the empowerment of citizens as a lever for social participation, taking into account the new digital tools for communication, content generation and interaction with audiences. In this case, with the aim of articulating information to facilitate aid and demonstrating high levels of resilience and social commitment in the face of the catastrophe.

Continuing along these lines, the consultation of social initiatives also delved into the level of credibility of the conventional media, in order to understand the specific typology of social networks that emerged during the post-dana, the subject of the fourth and last research question.

First, we delved into the perception of social initiatives in relation to the conventional media system. And the figures, despite our initial suspicion, do not show a high level of distrust in the traditional media, despite a scarce 10% who give zero credibility to television. These figures show that in episodes of crisis, traditional

media continue to gain trust in the search for quality news, as happened during the Covid-19 pandemic (Casero-Ripollés 2020), when the risk of fake news in the social perception of public health was also revealed (Islam et al. 2020; León et al. 2022; Arcos, Rosso and Salaverría 2025). In fact, media such as radio -which took relevance during the days of uncommunication because transistors can work without electricity and because it transmitted testimonies quickly- as well as the regional public media, television and radio (*Á Punt*). achieved high levels of social acceptance, averaging around 90% (Figure 3).

Figure 3. Types of publications on social networks according to solidarity initiatives



Source: own elaboration based on the survey

In turn, the response to the surveys by citizen initiatives shows a total unanimity regarding the usefulness of social networks in order to "reach the largest possible number of people", both to convey the message and "to achieve greater dissemination". The digital paradigm, to the detriment of social media, is perceived as "the best way to give visibility to the mobilization".

The quantitative study of the social networks of the initiatives studied reveals that Instagram was the network with the highest number of publications, interactions and followers. Data that coincide with the results of the CIS, which showed that television and social networks were the media chosen to follow the dana and, among them, 46% chose *Instagram*, 30.4% *Tik Tok*, 27.9% *Facebook* and 27.1% *X* (CIS 2024)¹.

Consequently, we deepen our analysis in the Instagram profiles of the initiatives. First, we highlight a relevant behavior that shows in figures the citizen demand for information about the dana not covered by other channels. We selected six of the profiles born after the dana on *Instagram* (date February 28, 2025) to show this reality: 1) *Suport Mutu*: 77 posts; following 85 and 22,100 followers; 2) *Dana desaparecidos*: 39 posts; following 127 and 36.200 followers (October 30: 13,300 likes, first post); 3) *Ayuda Terreta*: 18 posts, following 10 and 26,900 followers, 4) *DanaKids*, with 21 posts, following 9 and 16,200 followers and 5) *Proyecto Alicia*: 13 posts, following 38 and 1,845 followers.

¹ CIS (December 2024): Social Networks through which it was reported during the October 2024 dana: <https://www.cis.es/detalle-ficha-estudio?migrado=&idEstudio=14865&idPregunta=652780&origen=pregunta>

4.6 Communication Narratives (P3.2)

Next, in order to answer the last research question, focused on the narrative framing of citizen participation in the Valencia dana episode, we opted for a qualitative analysis of the social networks of the studied profiles. The hashtags to identify frames, very useful (Tahamtan et al. 2021; Liu et al. 2022) was discarded due to their scarce use, a fact that shows that the authors of these profiles, coming from civic movements, are not involved in journalism or professional communication.

After the survey of different social networks, we conclude Instagram was de more active, especially due to the extraordinary number of followers, as shown below For this reason, we focused the framing analysis in the feed of Instagram profiles of five initiatives, all of them created specifically after the dana: *Suport Mutu* (77 post, 85 following, 22.100 followers); *Dana desaparecidos* (39 post, 127 following, 36.200 followers), *Ayuda Terreta* (18 post, 10 following, 26.900 followers); *Proyecto Alicia* (13 post, 38 following, 939 followers, *DanaKids* (21 post, 10 following, 15.600 followers) and *Artist for Valencia* (88 post, 65 following, 939 followers). Forming a sample of N=256, between 30th October 2024 and 31th March 2025.

The framework map resulting from this study shows five approaches, both the emergency and reconstruction periods. They are the following: 1) Solidarity Action (SA): Includes all activities of solidarity, aid, volunteering, etc; 2) Economic Action (EA): Linked to economic donations and donations of objects to meet needs; 3) Political Participation (PP). Contents showing political action; 4) Social Action (SAV): related to Vulnerable groups such as migrants; 5) Environmental Action (EA). Related to environmental, climate change or sustainability narratives.

In the emergency phase, SA narratives prevail, followed by EA and SAV; in the recovery phase, SA remains at high levels and SA, SAV and PP emerge to a greater extent; however, SAV is absent in both periods. The principal conclusions of the narrative frames are conditioned by the dana phenomenon whose potency has been aggravated by climate change.

5. Discussion

The main objective of this research is to analyse the communicative resilience of Valencian society after the DANA disaster on 29 October 2024, highlighting, as a key element of this resilience, the emergence of digital citizen initiatives in response to the slow or absent institutional response. Other scientific analyses agree that the official response in issuing alerts was late or inadequate, which led to an information vacuum (Moreno Castro 2025) and a proliferation of disinformation messages (Arcos, Rosso and Salavedría 2025), as also found in the research carried out.

Analysis of the citizen initiatives that emerged in response to the disaster has shown that civil society organised itself quickly using social media and communication technologies to disseminate information and organise aid, often as a form of ‘digital word of mouth’. but it is also worth highlighting the effective public service role of the media (both conventional and digital), which warned of the risk in advance and provided continuous coverage, in contrast to the late official alert, as also pointed out by Moreno Castro (2025) in her research.

Citizen initiatives have acted as influential communicators, generating both information and trust, as pointed out by Liu et al. (2022), who conceptualise the dissemination of information as a key process in social media during crises, where the ‘spatial clustering of risk discussions’ shapes the flow of information.

This last idea is related to the results of this research, which detected how these citizen initiatives act to viralise content and reach the population. Social capital is analysed as one of the three key dimensions for communicative resilience, affirming that the citizen initiatives analysed generated and consolidated social capital based on mutual trust and relational cooperation.

In this sense, Nakagawa and Shaw (2004) define social capital as a function of trust, social norms, participation and networks, and identify it as a fundamental ‘missing link’ for successful and rapid post-disaster recovery, using cases such as the Kobe and Gujarat earthquakes. The situation of the Valencia storm also seems to have followed this model of social capital, including concepts such as bonding, bridging and linking social capital when referring to collaboration and knowledge between initiatives in Valencia.

The citizen initiatives analysed in the Valencian case generated narratives that moved away from catastrophism, focusing on solidarity and community action, which helps to overcome trauma. It also emphasises citizen empowerment by allowing people to be ‘prosumers’ of information, strengthening participatory democracy. Climate Outreach, a well-known NGO working to combat climate change (<https://climateoutreach.org/>), advocates for narratives that emphasise ‘agency’ (the ability to act) and avoid simplifying the complexities of climate change and migration, seeking accurate and nuanced public understanding. This coincides with the focus detected in this research on community action and support.

In general terms, the contribution of this research focuses on the mixture of social capital, communication through social networks and resilience after a disaster, a combination that is not included in other studies on social capital, which approach it from a more traditional context, focusing on community activities, neighbourhood associations and pre-existing organisations, with little or no mention of digital communication.

The present analysis reveals a low level of trust in public administrations (regional government, provincial council, town councils) on the part of the citizen initiatives studied, which is in line with other research criticising the authorities for not taking journalistic information into account, but does not directly assess the perception of citizen trust. In short, the top-down institutional response was perceived as deficient.

The specific perspective on how citizen digital communication and emerging social capital were fundamental to resilience in a particular climate disaster, that of the Valencia storm, is an important contribution to further work on strengthening citizen initiative and complementarity between the public and private sectors in times of emergency. While it shares with other texts the premise that social media and self-organisation capacity are crucial in emergencies, this research is distinguished by its sharp focus on real-time digital activism during a recent event and by its measurement of citizens' perception of trust in the authorities and the media.

6. Conclusions

This research has addressed the communicative resilience of social movements and also their influence on social innovation and social capital based on mutual trust and relational cooperation. The conclusions show how the communicative resilience of citizens in the face of a climatic catastrophe, such as the Valencia dana, is manifested in the capacity to generate agile, reliable and effective responses through self-organized digital networks.

The initiatives analysed can be qualified as innovative with social impact, because they are experiences of social innovation not only because of their nature, but also because of their social transformation objectives. The quick response of the solidarity initiatives in the development of tools, dissemination through alternative

channels and collaboration between groups are distinctive features of a solidarity ecosystem focused on the territory affected by the hurricane, but whose ramifications go beyond the local level. Social networks at the service of citizen activism, both in terms of the creation of information -and help, in this case- and the demand for content related to the environmental and human catastrophe.

Regarding communicative resilience, this study demonstrates the lack of institutional response and information during the emergency. The absence during the first moments, or the slowness with which the Administration at different levels offered information to the public caused an information vacuum that was filled by civil society through alternative channels, generating immediate and, for the most part, reliable flows. This response reveals citizens' capacity for self-management of communication in complex situations and also is a clear manifestation of resilience and adaptation. Furthermore, narratives focused on action, solidarity and reconstruction, which moved away from the usual catastrophism to focus on solutions and concrete actions. This perspective re-signifies the catastrophe narrative and contributes to overcoming the trauma.

In turn, participatory communication in the digital environment promoted a model of social innovation based on solidarity for mutual aid. The intensive use of tools such as Instagram, WhatsApp or Telegram, and digital platforms, enhanced horizontal and participatory communication, in addition, these practices facilitated the rapid dissemination of information, as well as the coordination of assistance and the articulation of citizen networks. The creation of contents in different formats and their dissemination strengthened the legitimacy of the initiatives and their communicative impact.

This citizen empowerment through the strategic use of communication technologies, since the autonomous and effective management of digital tools gives people the ability to be information emitters, not only consumers (prosumers). This strengthens participatory democracy and prepares us for future crises, while demonstrating social capital capacity, because personal and community networks allowed messages to be validated and amplified. At the same time, high capacity for interconnection between initiatives, which were able to collaborate from the outset and generate a network of trust, strengthening the flow of information and facilitating a coordinated and cohesive response.

During the Valencia dana, social networks functioned as key infrastructures for citizen mobilization and coordination, favouring both the dissemination of information and the creation of alternative narratives to the institutional and media discourse. The communicative action of these initiatives was not limited to the moment of emergency, but extended over time, articulating strategies for physical and emotional reconstruction, and consolidating collaborative networks with territorial and even international impact. The creation of networks of interpersonal trust and social capital, among which communication flows more effectively, have contributed to increase the capacity for interconnection between initiatives, which were able to collaborate from the outset and generate a network of trust, strengthening the flow of information. Personal and community networks allowed messages to be validated and amplified. This experience reinforces the value of digital activism as a fundamental tool for resilience in the face of socio-environmental crises.

Citizen narratives focused on action, solidarity and reconstruction moved away from the usual catastrophism to focus on solutions and concrete actions. This perspective re-signifies the catastrophe narrative and contributes to overcoming the trauma. The sustainability of many initiatives, beyond the emergency, evidences a clear commitment to citizens, to service, in particular to continue offering reliable information. This indicates that communication resilience is not only reactive, but also proactive, with the capacity for transformation in the medium and long term.

The difficulties detected -mainly logistical, transportation and institutional relations- highlight the need for administrations to make processes more flexible and support this type of spontaneous initiatives. Certainly, the urgency of rescue and the safeguarding of human life is the priority in this type of situation; however,

communication, for instance, the ability to generate reliable information, is key for citizens who need to know the full extent of the situation in order to know how to act and make decisions.

The trust placed in collaborative networks and social and academic entities suggests that, in the face of future disasters, strengthening and facilitating these channels of communication and cooperation may be key to increasing social resilience to disasters of any kind. Citizen empowerment arises from the strategic use of communication technologies, as the autonomous and effective management of digital tools enables people to become not only consumers of information but also its producers (prosumers). This strengthens participatory democracy and prepares us for future crises.

The Valencia data showed that logistical and institutional challenges require more flexible processes and support for spontaneous initiatives. Social networks played a crucial role in mobilizing citizens, sharing reliable information, and building alternative narratives. Their communication extended beyond the emergency, aiding physical and emotional recovery, strengthening collaborative networks, and confirming digital activism as key to resilience in socio-environmental crises.

The trust placed in collaborative networks and social and academic entities suggests that, in the face of future disasters, strengthening and facilitating these channels of communication and cooperation may be key to increasing social resilience to disasters of any kind.

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