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Leveraging social media for resilient cultural heritage: a people-centred conceptual framework for community engagement and crisis response

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Abstract

In the face of climate change, cultural heritage (CH) is vulnerable to risks, yet it is a powerful source of resilience. As efforts in climate change adaptation and disaster risk reduction progress, CH plays a crucial role in strengthening communities' capacity to recover and adapt. International frameworks such as the Hangzhou Declaration and the Sendai Framework emphasise the integration of CH into people-centred strategies for strengthening community resilience. This paper develops a people-centred conceptual framework that explores the intersection of CH, community resilience, and digital tools, drawing on emerging theories in heritage and resilience studies, particularly in relation to digital practices. The framework advocates for more inclusive and locally contextualised practices by engaging communities in the co-construction of heritage values and enhancing multivocality through digital platforms. It highlights the transformative role of digitally mediated heritage practices, from digitisation and crowdsourcing to active community participation in crisis response. Despite the growing potential of digital tools, significant challenges remain, such as data bias, unequal access, and the need for a more holistic approach that overcomes both traditional rigid differentiation and the split between tangible and intangible heritage, as well as between heritage by designation and heritage by appropriation. This study offers future directions for developing more resilient heritage practices, focusing on the equitable inclusion of diverse community voices in shaping CH preservation and resilience strategies.

Keywords Cultural heritage, Climate change, Social media, Community resilience, Co-construction

1 Introduction

International declarations and policy guidance documents acknowledge cultural heritage (CH) as a contributor to many of the Sustainable Development Goals (SDGs), including resilience and adaptation to climate change (SDG 13) (Hauser 2020; UNESCO 2021). As a sociocultural construct, CH helps reinforce a shared sense of identity, which is essential during climate crises, as it supports community resilience (Fabbricatti et al. 2020; Fatorić and Egberts 2020). This role has been further emphasised in recent policy documents, such as the Hangzhou Declaration and the Sendai Framework for Disaster Risk Reduction, which call for people-centred disaster risk reduction strategies that integrate CH into recovery processes, emphasising its active role in reinforcing well-being and social cohesion—critical factors for the resilient recovery of affected communities (UNESCO 2013; UNDRR 2015).

However, much research has traditionally focused on the vulnerability of CH rather than its potential as a source of resilience (Wardekker et al. 2023). This dual

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perspective—viewing CH as both a vulnerable asset and a source of resilience—reflects the broadening scope of heritage that goes beyond monuments and traditional expert-driven assessments to emphasise a holistic understanding of the city as a living heritage (Ginzarly et al. 2019). This broader understanding necessitates greater attention to multivocal heritage narratives and community involvement in co-constructing heritage values (Council of Europe 2005; 2018; UNESCO 2011). In this context, organisations such as the European Commission and UNESCO emphasise the development of digital tools to engage communities in preserving and sharing their CH, underscoring the importance of citizen participation and knowledge dissemination, whereas social media is expected to contribute to enhancing inclusion (UNESCO 2011; European Commission 2022).

In the digital age, social media and digital tools have transformed how CH is produced, consumed, and preserved (Ginzarly 2021). From digitising heritage to real-time disaster response, digital platforms empower communities, enhance participation, and contribute to the resilience of both the heritage itself and the communities that safeguard it (Choi et al. 2021; Kumar 2022). Despite the growing recognition of CH in terms of resilience and climate adaptation, significant challenges remain. Current policies often rely on traditional, expert-driven categorisations of heritage that limit the ability to capture multivocal heritage narratives (Fredheim and Khalaf 2016), especially in relation to climate change and disaster risk (Déom and Valois 2020). Moreover, many policies continue to treat heritage sites in isolation, failing to embrace a holistic landscape approach (Cook et al. 2021).

This paper argues that social media should not be viewed merely as a tool for knowledge generation but also as part of a larger paradigm shift in how the public engages with heritage. It advocates for a people-centred approach that recognises the broader landscape of digitally mediated heritage, including its potential to reshape the interpretation, dissemination, and mobilisation of heritage. By adopting this perspective, the focus shifts from the existing dichotomies between designated (formal) and appropriated (informal) heritage and between tangible and intangible heritage to a more holistic understanding of the city as a living heritage.

The objective of this paper is to explore how social media can be leveraged not only as a data source but also as a transformative tool that drives the co-construction of local heritage values, enhances community resilience, and stimulates public engagement. The key questions guiding this study are as follows: How can social media contribute to the cocreation and preservation of heritage values? What role does social media play in fostering community resilience, particularly in crisis situations? How can social media be leveraged to inform and guide sustainable heritage conservation and resilience strategies? To address these questions, this research develops a conceptual framework that integrates CH, community resilience, and digital tools into a unified model. To this end, it employs a comprehensive multidisciplinary literature review that is structured into three parts: the first part sets the background by linking the concept of CH as a living practice with resilience-building; the second part explores how social media contributes to grassroots heritage practices while addressing issues such as data biases, unequal access, and overrepresentation of certain voices; and the third part examines social media's role in crisis response, focusing on how digital platforms improve situational awareness, enable resource mobilisation, and support collaborative problem solving during disasters. This discussion ultimately led to the development of a people-centred conceptual framework that advances the use of digital tools in heritage management and resilience-building practices, providing structured guidance for experts, decision-makers, and communities in the application of these tools.

2 Research method

A conceptual framework connects concepts and established theories by articulating and systematising relationships, thereby advancing knowledge on issues or themes that have yet to be explored together (Rocco and Plakhotnik 2009). It integrates the researcher's conceptualisation of the presumed relationships among concepts to explore research opportunities and theoretical implications (Rocco and Plakhotnik 2009; Luft et al. 2022). In this study, the relationships among CH, community resilience, and digital tools are articulated through a comprehensive multidisciplinary literature review using three Scopus searches.

The first search explores the contribution of cultural heritage—being a living system—to resilience. This search used the key terms ('cultural heritage' OR 'urban heritage') AND 'urban resilience', returning 13 and 9 articles, respectively. Findings from this search are presented in Sect. 3.

The second search explores the application of social media in urban and heritage studies. Given the significant increase in publications—from 6 in 2010 to 1,086 in 2024—the search was narrowed by selecting review articles focused on the role of social media in the preservation of CH, public engagement, and the co-construction of heritage values. Ten key reviews, selected for their direct relevance to these themes, collectively examine more than 3,500 articles, including those by Ilieva and McPhearson (2018), Bubalo et al. (2019), Calcagni et al.

(2019), Toivonen et al. (2019), Kong et al. (2020), Ginzarly (2021), Liang et al. (2021), Zhang et al. (2022), Yang and Liu (2022), and Rachman (2024). In Sect. 4.1, the findings are synthesised with additional primary research articles. This approach integrates theoretical insights from reviews with empirical research, enabling a comprehensive examination of the challenges and opportunities presented by social media in heritage management within the current scientific discourse.

The third search draws on urban resilience studies, which focus on how social media and digital technologies have become integral to building and enhancing community resilience. The Scopus search employed the terms 'social media' AND 'community resilience', yielding 46 results. The findings from this search are presented in Sect. 4.2.

On the basis of the findings from these investigations, a conceptual framework is developed that illustrates the interconnections among heritage values co-construction, community resilience, and the transformative role of social media.

3 Setting the background: cultural heritage and living practices of resilience

The predominant perception among experts and local communities is that CH is a static product, limited to physical spaces and monuments, rather than a dynamic process of living practices (Chapagain 2023). As a result, concerns for heritage preservation in disaster management are often viewed as secondary to saving lives and livelihoods (Jigyasu 2019). While the *physical space* of CH serves as a support system in recovery, resilience is equally derived from the *lived space*, which encompasses community institutions, cultural practices, and traditional knowledge (Jigyasu et al. 2013; Chapagain 2023); therefore, there is a need for community-based human agencies and systems in the resilience framework.

Traditional practices and knowledge systems, such as agricultural methods and construction techniques, demonstrate sustainable human–environment interactions, helping communities adapt while preserving their cultural identity (Garcia 2020). They offer time-tested methods for mitigating disaster impacts and enhancing adaptive capacity (Jigyasu et al. 2013). For example, in Timbuktu, traditional practices and materials, along with local craftsmen's participation, were key in restoring and conserving CH in response to climate change (Garcia 2020). Similarly, the Shushtar Historical Hydraulic System in Iran highlights how sustainable water management practices rooted in CH enhance both ecological and cultural resilience (Shirvani Dastgerdi and Kheyroddin 2023).

Traditional knowledge can enhance hazard awareness within communities, drawing on life skills and lessons from past experiences (Ravankhah et al. 2017). The incorporation of lessons from CH drawn from past disasters can enhance disaster risk management by strengthening the link between risk management practices and the cultural dimension of local hazards (Iavarone et al. 2019). This approach makes disaster risk communication more meaningful to local communities by aligning it with pre-existing knowledge and lived experiences, offering valuable guidance for adaptation and recovery (Iavarone et al. 2019). A study in Bali's volcanic regions revealed that CH speeds up psychosocial recovery, improves disaster preparedness, and strengthens local awareness (Wardekker et al. 2023).

In addition to traditional knowledge, other intangible cultural assets—such as oral traditions and performances—also play crucial roles in building community resilience by fostering social support, collective identity, and a sense of belonging (Holtorf 2018; Saito 2016). For example, traditional music was crucial in building resilience for the Sodong Buddhist Village community during the COVID-19 pandemic (Hanif and Sri Maruti 2024). Similarly, the Gullah community in the southeastern United States highlights how language and traditions enhance community resilience and promote sustainable community-led heritage conservation (Ghahramani et al. 2020). As communities face disasters, their collective memory and shared cultural identity provide the foundation for recovery (Bui et al. 2020). The ability to draw on collective memory enables communities to reconnect with their heritage, reinforcing social cohesion in the aftermath of a crisis (Fabbricatti et al. 2020).

The evolving nature of CH also contributes to its resilience. Changes to heritage in the landscape—whether through change, destruction, or replacement—reflect a process of interpreting, utilising, and reshaping heritage as it evolves (Holtorf 2018). The cultural significance of heritage constantly changes across time and space, requiring continuous adaptation (Holtorf and Fairclough 2013; Harvey and Perry 2015). In this way, CH imparts valuable lessons into embracing change, thereby fostering resilience to future challenges.

CH is not a singular, static concept but rather a living and evolving concept. Its associative values are socially constructed and attributed (De la Torre 2013). They arise from how individuals perceive, experience, and connect with heritage (Ginzarly, Srour and Pereira Roders 2021). Heritage values are shaped by various contextual factors, including economic conditions, cultural trends, and social dynamics, which lead different groups to assign diverse, and at times conflicting, values to CH (De la Torre 2013; Ginzarly and Teller 2020). By recognising

this plurality, resilience strategies can move beyond the limitations of official heritage discourse and embrace the unique understandings of value held by communities themselves. This shift is critical to ensuring that CH preservation efforts truly serve the communities most affected.

As there is a growing need to embrace more inclusive people-centred approaches that recognise the diverse interpretations of heritage values across communities, digital platforms offer a promising avenue, allowing communities to actively participate in sharing, documenting, and defining their CH. The next section addresses how digitally mediated heritage practices, ranging from passive data collection to active engagement, transform the way CH is coproduced and how communities interact with their heritage in the digital age.

4 Results and discussion

4.1 Digitally mediated heritage practices

CH traditionally mediated through vertical/top-down entities—international organisations, governments, or experts—is now coproduced through digital platforms, as seen in various types of virtual communities, i.e., communities of interest, goal-oriented communities, and communities of practice (González-Anta et al. 2021), as well as modes of digitally mediated heritage practices (official, unofficial, active and passive). The role of digital technology in heritage discourse has been associated with the concepts of democratisation, multivocality, a paradigm shift in how communities engage with heritage, and opportunities for greater inclusion in the emerging digital public sphere (Galani, Mason and Arrigoni 2020; Freeman 2018).

Several reviews have examined social media's role in fostering public engagement in decision-making processes related to areas such as urban parks, CH, and landscape perceptions. Zabelskyte et al. (2022) reviewed 22 studies and identified how social media data capture the needs, activities, and preferences of urban park visitors. While the review identified advantages such as large datasets, real-time information, and cost effectiveness, it also highlighted limitations such as biased data, insufficient sociodemographic information, and privacy concerns. Liang et al. (2021) explored the role of social media in CH sustainability, whereas Bubalo et al. (2019) reviewed crowdsourcing techniques in landscape perception research, stressing the need for better engagement strategies. Calcagni et al. (2019) explored how public engagement in sustainability discussions evolves through social media platforms, where cultural ecosystem services and plural and relational values are negotiated, defined, and co-constructed. They also noted that the implications of these interactions for social–ecological justice and sustainability need further exploration. These reviews underscore both the potential and challenges of using media to foster public engagement and the co-production of heritage values.

Scholars have used social media to capture public voices and human–environment interactions, which are vital for understanding heritage in urban and landscape studies. Yang and Liu (2022) reviewed 1,220 publications to examine various social media data analysis methods, highlighting advancements in location-based analytics, text mining, and visual analysis for urban design and landscape research. They identified deep learning frameworks, sentiment analysis, and image content analysis as emerging methods, with research focusing on spatial cognition, landscape feature extraction, public perceptions, and urban dynamics. They identified limitations in data acquisition, user privacy, and generalizability due to the small sample size of geotagged data. Mitigating these issues may involve integrating metadata with traditional methods, combining various big data types (e.g., land use, GPS, demographic data), and applying advanced machine learning techniques (Yang and Liu 2022). Reviews by Kong et al. (2020) and Toivonen et al. (2019) also emphasise the role of social media role in human behaviour and interactions at various scales while highlighting challenges in data bias and privacy issues.

While passively collected social media data have been explored, the role of social media as a platform for communities to actively engage in heritage preservation and the co-construction of heritage values has also been examined. Rather than solely relying on institutions and experts, communities use platforms such as Facebook and WeChat to actively preserve and share both tangible and intangible heritage. For example, Bai et al. (2022) demonstrated how WeChat facilitates the crowdsourcing of local heritage data, allowing the mapping of how heritage sites are perceived and valued by the public. Moreover, Ginzarly and Teller (2020) addressed the online activities of Facebook groups that are created by the public to claim an identity, articulate alternatives to dominant narratives of heritage, and challenge the official heritage discourse. Gregory (2015) examined how grassroots online communities mobilise against heritage loss through social media activism. More recently, Rachman (2024) reviewed effective examples of how local communities use digital spaces to preserve tangible and intangible heritage. The study highlights practical strategies, such as online discussions and event promotion, which enable communities to participate in preservation efforts.

In Fig. 1, the active/passive axis reflects the spectrum of engagement, from passive consumption to active participation, whereas the horizontal/vertical axis illustrates the coexistence of hierarchical, expert-driven models
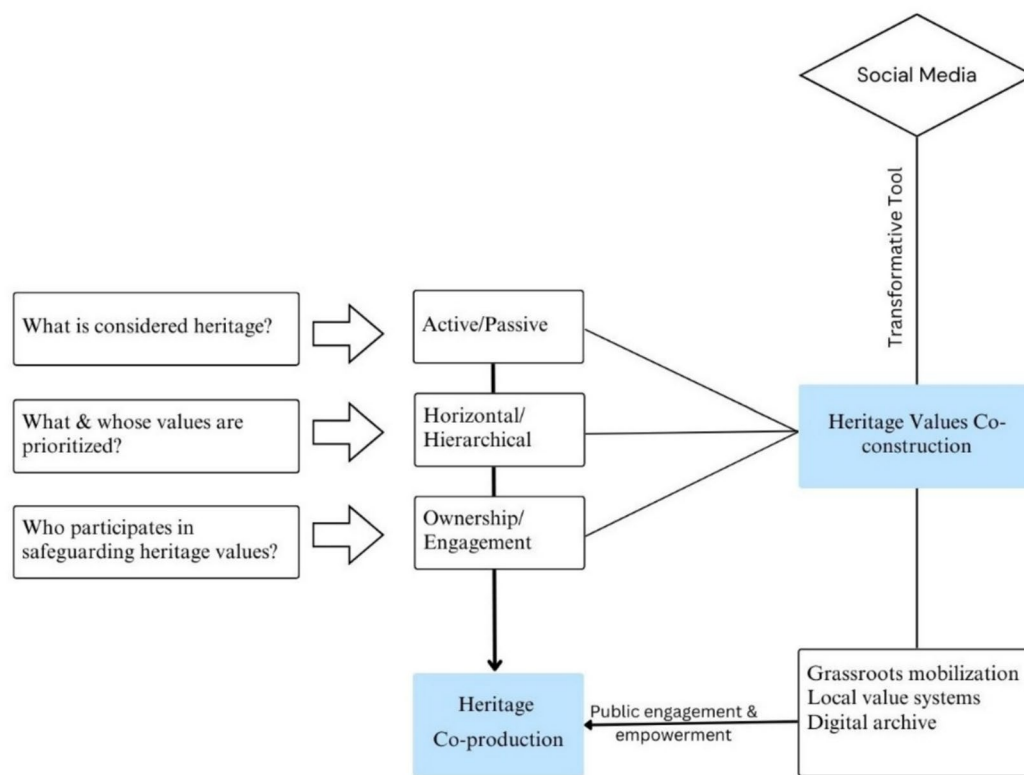
Fig. 1 Building the framework, social media and heritage values co-construction (Source: the authors)

and more horizontal, community-driven approaches. As online communities increasingly engage in co-creating heritage content, the boundaries of institutionalised heritage are expanded, questioning what is considered a heritage asset. The presence of multiple voices on social media prompts reflection on whose values are prioritised in digital heritage practices and whether the voices represented on these platforms reflect the priorities of diverse communities or reinforce dominant narratives. Social media plays a significant role in safeguarding intangible CH. Ramazanova et al. (2024) showed how international platforms promoting gastronomy raise awareness within communities, facilitate knowledge sharing, and preserve culinary practices. Hammou et al. (2020) examined how artisans in Marrakech use social media to share traditional crafts with a global audience. They highlighted how these platforms allow local residents to engage with heritage values tied to their city's traditions, creating a more inclusive understanding that reflects both traditional practices and contemporary interpretations (Hammou et al. 2020). However, they also noted the challenge of maintaining authenticity as crafts adapt to global market demands. Through a case study of intangible CH in Bangladesh, Khalid and Chowdhury (2019) explored the role of social media as an arena for building awareness,

sharing knowledge, and promoting innovation, ensuring that cultural practices remain relevant in contemporary society. In addition to preserving cultural practices, social media contributes to the preservation of collective memory.

Furthermore, social media contributes to the preservation of collective memory. Van der Hoeven (2019) explored 19 Dutch heritage projects, illustrating how communities create narratives through digital storytelling and reclaim their cultural identities. Recent studies highlight how social media helps communities document and share memories of heritage sites, creating digital archives and opening new opportunities for the co-construction of heritage values (Bozas et al. 2024; Nummi 2018).

Despite the potential of social media, its data present biases, such as the overrepresentation of certain demographics, unequal access to platforms, the exclusion of marginalised voices, platform overreliance, and the oversimplification of complex narratives (Olteanu et al. 2019; Tufekci 2014). Methodological challenges related to data collection and processing have led scholars to propose strategies for improving workflows, such as using machine learning, integrating data sources, combining social media with traditional methods, developing

domain-specific training datasets, and refining privacy protection measures (Ginzarly 2021; Ilieva and McPhearson 2018). While addressing these challenges is crucial, the rise of active crowdsourcing offers a complementary approach by directly engaging communities in heritage preservation, fostering more inclusive participation and collaboration between experts and the public.

Active crowdsourcing directly engages and empowers communities, broadening participation in CH preservation and fostering collaboration between experts and the public. By involving local communities in curating their heritage, crowdsourcing promotes an inclusive approach to conservation (Tricarico, Lorenzetti and Morettini 2023). Examples include Historic England's 'Enriching the List' initiative, which invites the public to share stories, images and other materials to be included in the National Heritage List (Historic England 2022), enriching the national heritage record and promoting broader community engagement and co-production. Similarly, the 'Citizen Archivist' program by the U.S. National Archives invites volunteers to transcribe and tag historical records, and the 'Europeana 1914–1918' project gathers stories and artefacts related to the First World War from the public (Liu 2021; Roiu 2020). In the Global South, the Indigenous Knowledge Crowdsourcing Management System, developed for the ovaHerero and ova-Himba communities in Namibia, empowers indigenous people to manage their CH by equipping them with digital tools (Stanley et al. 2017). Such initiatives demonstrate how crowdsourcing can facilitate the sharing and accessibility of CH data, offering new ways to preserve and understand heritage. Digital tools such as storytelling and geotagging further engage the public, as seen in the Palace of the Grand Master of the Knights of Rhodes crowdsourcing project (Ziku et al. 2024). However, challenges such as maintaining data quality, motivating contributors, and overcoming linguistic barriers persist.

In Fig. 1, the ownership/engagement axis highlights how digital platforms, through grassroots initiatives or crowdsourcing, enable collaboration between experts, institutions, and the public, allowing communities to engage with and take ownership of safeguarding and conserving their heritage. Nevertheless, it is essential to consider whether these platforms facilitate equitable participation, as uneven access and representation may limit marginalised groups'ability to fully engage in heritage preservation.

4.1.1 Synthesis of insights: Building the framework for heritage co-construction

Building on the previous exploration of social media's role in heritage practices, several critical questions that guide the co-construction of heritage values through digital platforms have emerged. These include what is considered heritage, what and whose values are prioritised, and who participates in safeguarding these values, particularly when social media is utilised as a tool for engagement. These questions define the conceptual scope of heritage values co-construction (see Fig. 1).

By interrogating *what* constitutes heritage, the conceptual framework uncovers the tensions between institutional definitions and community-driven interpretations fostered by social media. Although digital access to CH content enables a polyvocal interpretation of heritage that is less dependent on experts, decisions about what is considered heritage and what is commissioned for digitisation are not inherently part of this democratisation (Taylor and Gibson 2017). This tension sets the stage for examining heritage values through a lens of inclusivity and dynamic cultural engagement. Participation on official heritage websites often reinforces the values of experts and maintains the dominant heritage discourse, raising questions about the true contribution of digital technologies in fostering participative democracy (Aigner 2016; Wheeler 2016; Loader and Mercea 2011).

In considering *what* values are prioritised and *whose* values are prioritised, the conceptual framework addresses the complexities of power, representation, and value systems that shape heritage preservation. The potential of social media platforms to foster cocreation and meaningful public engagement in CHs depends on several key factors, including the nature and level of engagement and the context in which it occurs. A significant factor is whether engagement is initiated through hierarchical or horizontal approaches. The conceptual framework considers the tension between these two approaches, reflecting the nuanced role that social media plays in mediating top-down efforts and bottom-up, community-driven initiatives. In top-down efforts, cultural institutions lead by launching structured campaigns, such as official hashtags or crowdsourced public opinions, guiding public participation within a predefined framework. Here, the type of participation—either passive (e.g., content consumption) or active (e.g., contributing to heritage narratives through sharing and commenting)—affects the success of public engagement. Conversely, community-based initiatives emerge organically from the public, with individuals or communities creating grassroots movements—such as hashtag campaigns or online groups—that shape heritage discussions. Unlike institution-driven efforts, these movements allow the public to freely determine what content to share, with the rules of engagement evolving naturally rather than being imposed by external authorities. This distinction is critical, as it influences not only the depth of public

involvement but also the sense of ownership developed by communities in the cocreation process.

In exploring who participates in safeguarding heritage values, the conceptual framework addresses the socially constructed nature of heritage, where community engagement in conservation practice becomes about 'managing continuity through change' and moving towards a form of 'social practice' (Chitty 2016). This perspective expands the focus from traditional techniques and treatments for monuments or places to the consideration of how people engage in decision-making about their heritage and the process of participation (Chitty 2016; Avrami 2020). It also emphasises the importance of bringing together different local stakeholders to enable novel practices of engagement. In this context, democratised cultural heritage practices are centred on human interactions, well-being, community benefits, capacity building, and the development of a sense of ownership, alongside tangible outcomes (Wijesuriya, Thompson and Court 2016).

4.2 Social media in crisis response: Enhancing community resilience

In recent years, scholars have increasingly turned to social media as a valuable data source to make cities more resilient to disasters. For example, Zou et al. (2018) used Twitter as a data source to explore emergency management during the Hurricane Sandy event and reported that social media data could help improve post-disaster damage estimation. Moreover, Yao and Wang (2020) developed a real-time data-driven analytical and geovisual system for analysing and visualising streaming data from social media to enable smart and rapid responses to extreme urban events. Similarly, Yao et al. (2021) applied Weibo data from the Changning earthquake and proposed a method for rapid seismic intensity assessment. Their findings demonstrate that data from Weibo in the short term can quickly respond to sudden earthquakes, identifying the main affected areas and estimating proximity to the epicentre within 10 mins. Additionally, Roy et al. (2021) developed a hybrid convolutional neural network model that filters and categorises humanitarian-related social media posts, specifically for hurricanes and floods. Furthermore, Li et al. (2021) demonstrated the efficacy of social media data tracking to aid evacuations during wildfire events in the western United States, with temporal and spatial analysis confirming the alignment between social media data and official information. Most recently, Yan et al. (2024) proposed a framework using Sina Weibo to extract fine-grained information during disasters, further enhancing spatiotemporal awareness and improving emergency response capabilities.

Social media has become an essential tool in emergency response and resilience-building efforts, playing a critical role in facilitating timely information exchange and fostering social support through digital networks (Xie et al. 2022). Researchers in crisis communication and management have increasingly focused on the use of social media in disaster scenarios (Rasmussen and Ihlen 2017). One of the key aspects explored in the literature is the role of social media in enhancing resilience (Mihunov et al. 2020; Xie et al. 2022). Scholars argue that social media effectively enables (1) the dissemination of critical information and (Rasmussen and Ihlen 2017) the promotion of dialogue and relationship-building, (2) real-time coordination of grassroots-level responses, (3) the empowerment of communities to devise and implement emergency measures that mitigate the impacts of crises, and (4) the support of rescue and relief operations (Mihunov et al. 2020; Eriksson 2018; Rasmussen and Ihlen 2017; Xu and Wu 2015).

Recent research has increasingly focused on the role of social media in fostering community resilience. Community resilience, defined as the collective capacity of individuals to manage stressors and access shared resources through cooperation (Frounfelker et al. 2020), has emerged as a proactive approach to dealing with natural hazards (Cutter et al. 2008). According to Aldrich and Meyer (2015), this process allows groups to collectively access and utilise resources to achieve positive outcomes in times of uncertainty and stress.

Nine key themes are central to community resilience (Patel et al. 2017): local knowledge, community networks, communication, governance, health, resources, economic investment, preparedness, and mental outlook. In this context, digital technologies, especially social media platforms, have become critical tools for enabling collaboration and supporting community resilience efforts (Udwan, Leurs and Alencar 2020). For example, during the 2011 earthquake in Japan, Kaigo (2012) highlighted how smartphones became the primary means of communication when traditional media and internet access were disrupted by power outages. Reuter and Spielhofer (2017), through interviews with 1,034 citizens across 30 European countries, reported that social media plays a crucial role in promoting community resilience by facilitating information exchange during emergencies. Similarly, Hong et al. (2018) examined how social media portrayed and fostered community disaster resilience and social solidarity during the 2014 Sewol ferry disaster in South Korea.

4.2.1 Challenges of social media in crisis response
While social media has shown great potential in improving disaster response and resilience, it also presents

significant challenges, particularly with respect to inclusivity and ownership. The question of ownership pertains to who holds authority over the content and its dissemination, including the power to establish rules and norms around who is allowed to participate and how information is shared or restricted. A key concern is the digital exclusion of socially vulnerable communities during disaster responses. For example, an empirical analysis of Hurricane Sandy, which was based on spatial regression modelling, revealed that while physically vulnerable communities exhibited more intense social media activity in the pre-disaster phase, socially vulnerable groups were digitally excluded (Wang et al. 2019). Another study reported that while tweets during disasters often shared event-related information, they lacked the crucial risk alerts that the public expected (Liu et al. 2019).

On the other hand, social media can also be a crucial tool in ensuring faster dissemination of critical information to vulnerable communities. For example, a study analysing Twitter data from Hurricane Sandy reported that social media can also ensure faster dissemination of critical information to vulnerable communities, particularly regarding disaster preparedness, evacuation warnings, and recovery operations. However, the study suggested that social media users could become a primary source of information for raising awareness during future disasters (Roy et al. 2020).

Despite these positive aspects, several factors complicate the effectiveness of social media in enhancing situational awareness, including intermittent power outages, unequal access to social media platforms, and the ambiguous relationship between geotags and physical locations (Soden and Palen 2018). Moreover, Lam et al. (2023) outlined four key contributions of social media data to disaster resilience, such as serving as a communication platform, offering ground truth information, gauging public sentiment, and supporting predictive modelling. However, they also emphasised major challenges, including the spread of false information, disparities in social and geographical platform usage, difficulties in processing large and noisy datasets, and biases inherent in algorithms used for modelling.

4.2.2 Synthesis of insights: Integrating community resilience into the framework

Building on the studies discussed in this section, it is evident that social media plays a vital role in fostering community resilience, particularly by enabling social support, community building, and collective efforts. As a tool for crisis response, social media enhances real-time communication, facilitates situational awareness, and empowers communities to mobilise effectively during and after disasters. However, challenges related to the digital

divide persist, especially in the case of socially vulnerable communities. For example, during Hurricane Sandy, socially vulnerable groups faced digital exclusion despite increased activity from physically vulnerable communities (Wang et al. 2019). This raises a critical question: 'Who is digitally included/excluded?' —underscoring the need to ensure equitable access to social media platforms during crises.

In further examining social media's role, it becomes evident that while it can expedite the dissemination of crucial information, such as disaster preparedness, response, and recovery operations (Roy et al. 2020), its effectiveness varies depending on several factors. The question 'How effective is social media before, during, and after a crisis?' highlights the context-dependent nature of social media's utility. The ability to mobilise information quickly and efficiently can be influenced by factors such as access, platform use, the clarity of messages shared, audience engagement, and digital literacy.

Additionally, social media's role in conflict resolution is evident, as communities engage in dialogue and coordinate efforts to address disaster impacts. However, misinformation and digital divides complicate this process, leading to the following question: 'How can conflicts be resolved?' This involves addressing the spread of inaccurate information and the resulting challenges to public trust, which can hinder the effectiveness of social media in fostering collective resilience.

Overall, the integration of social media into crisis response and community resilience strategies demonstrates both its transformative potential and the need to address these key challenges to maximise its benefits. The conceptual framework developed here emphasises a people-centred approach, recognising the importance of inclusive public engagement, collaborative problem solving, and community-driven resilience efforts, which social media platforms can support if these concerns are addressed effectively (see Fig. 2).

5 Conclusion

The conceptual framework developed in this study advocates for a people-centred approach to heritage resilience, emphasising the transformative role of social media in co-constructing heritage values and fostering community resilience. Social media support grassroots mobilisation, real-time communication, and the digitisation of heritage while enabling early detection and documentation of damage during crises. This dynamic role enhances public participation in both crisis response and heritage co-production.

The framework highlights two key areas: (1) heritage co-production through digitally mediated practices, which fosters community engagement by enabling
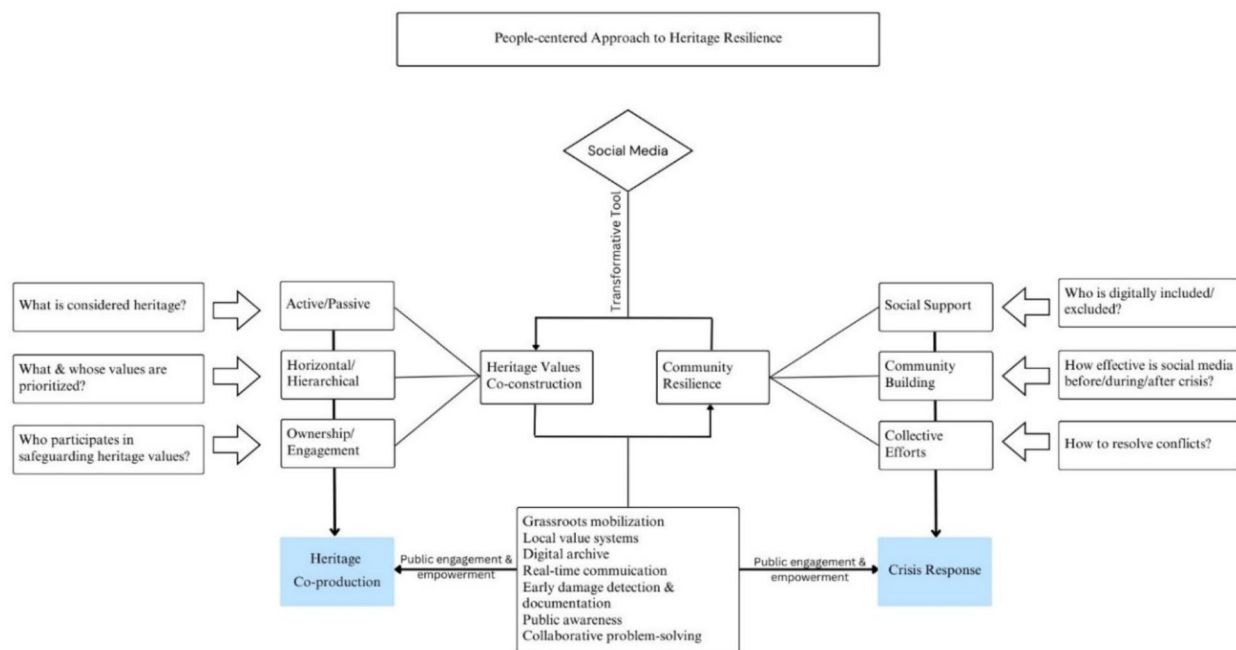
Fig. 2 Conceptual framework (Source: the authors)

active participation in the preservation and co-creation of heritage values; and (2) social media's role in crisis response, which facilitates real-time information sharing, community-driven actions, and rapid resource mobilisation, thereby strengthening resilience efforts. This approach ensures that resilience strategies are grounded in the lived experiences and values of those most directly affected, making them more inclusive and adaptable to local needs. However, challenges related to digital inclusivity and content ownership must be addressed to prevent the marginalisation of vulnerable communities in both heritage preservation and disaster response.

In conclusion, this people-centred framework offers a clear approach for assessing the role of social media in heritage co-production and crisis response. Its effectiveness can be evaluated through key questions: What is considered heritage? What and whose values are prioritised? Who participates in safeguarding heritage values? Who is digitally included or excluded? How effective is social media before, during, and after crises? How are conflicts resolved? These questions serve as a foundation for assessing the role of social media in heritage co-production and crisis response, ensuring that the strategies are both inclusive and adaptable to the diverse needs of communities.

While the framework proposed in this study has valuable implications, it has certain limitations. The dynamic nature of social media platforms and their varied uses across different contexts means that the practical implementation of the framework must be rigorously tested through case studies in diverse disaster scenarios. Moreover, the framework could benefit from further consideration of the evolving characteristics of digital platforms, which are continuously shaped by technological advancements, shifts in user behaviour, and changing policy environments. The challenge of digital inclusion, which is central to the equitable use of social media, requires ongoing examination and adaptation. The risk of exclusion of marginalised communities, particularly those lacking access to digital tools or facing social, economic, or political barriers, must be addressed in future studies. Additionally, the presence of diverse cultural, political, and social dynamics in different urban settings may shape the ways in which digital tools are used for community engagement and disaster response. An important area for future research is to explore how the unique characteristics of different urban contexts—such as local governance models and varying perceptions of heritage and resilience—affect the use of social media for fostering community resilience and co-creating heritage values. For example, factors such as public trust in social media, the influence of local governance structures, and the recognition of intangible cultural heritage could all shape how social media platforms contribute to both the resilience and preservation of heritage values. Investigating these cultural nuances will help ensure the framework's relevance, allowing its applicability in diverse contexts.

Abbreviations

CH   Cultural Heritage
SDG   Sustainable Development Goal
UNESCO   United Nations Educational, Scientific and Cultural Organisation
ICOMOS   International Council on Monuments and Sites

Authors' contributions

Manal Ginzarly: Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Funding acquisition, Conceptualization. Jacques Teller: Supervision, review & editing, Funding acquisition. All authors read and approved the final manuscript.

Data availability

Not applicable.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The author declare that they have no competing interests.

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