

Review Article

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The ‘Butterfly Effect’: Identifying pathways for sustainability transformation through social processes of disaster resilience

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Abstract

Non-technical summary. We reviewed published research on natural hazards and community disaster resilience to identify how relationships between people and their experiences of disaster interact to shape possibilities for positive transformative change. Research commonly analyzes processes within and across individual and collective or structural spheres of a social system, but rarely investigates interactions across all three. We present a framework focused on ‘spheres of influence’ to address this. The Framework shows how positive relationships that prioritize restoring shared, meaningful and purposeful identities can lead to expansive and incremental capacity for transformative outcomes for sustainability: a process we liken to the *butterfly effect*.

Technical Summary. Sustainability and disaster resilience frameworks commonly neglect the role of agentive social processes in influencing wider structural transformation for sustainability. We applied relational agency and social practice theory to conceptualize transformative pathways for enhanced sustainability through a review of peer-reviewed literature relating to natural hazards and community disaster resilience. We sought to answer two questions: 1. What are the social practices that influence transformative change for disaster resilience in the context of individual, collective and structural spheres of influence? 2. What are the social influencing processes involved, identified through relational agency? We found that empirical studies tend to focus on individual and collective or structural spheres but rarely offer a relational analysis across all three. Our findings highlight that positive relationships that prioritize restoring shared, meaningful and purposeful identities can act as a resource, which can lead to expansive and incremental transformative outcomes for sustainability: a process we liken to the *butterfly effect*. We present a Sphere of Influence Framework that highlights socialized practices influenced by relationality, which can be applied as a strategic planning tool to increase capacity for resilience. Future research should explore how socio-political practices (the structural sphere) influence distributed power within collective and individual spheres.

Social media summary. Disasters can generate extraordinary social dynamics. So, how can we optimize these dynamics for enhanced sustainability?

1. Introduction

Adverse impacts from natural hazards – such as wildfires, floods, tsunamis, and earthquakes – arise from disaster situations that occur as a result of how the hazard intersects with society. Devastating impacts from disasters continue to be exacerbated on a global scale and human choice and action at individual and societal scales can either enhance and decrease our state of vulnerability (Kelman, 2024). Social forms of action can shape the capacity for resilience amongst communities, and this means we need to identify new transformative approaches if we are to harness social processes to build sustainable, equitable, and socially just resilience for communities. We are guided by an understanding of transformative sustainability research defined as:

...the reflexive collaborative production of transformation knowledge (processes, pathways, levers and leverage points) organized as an intervention that facilitates intentional change toward a desirable future in a contextually defined system.

Horcea-Milcu et al. (2024, p. 3).

Such styles of research, both in terms of sustainability and resilience, invite us to ‘understand how individual actions influence and are in turn influenced by social structures and norms’ (Naito et al., 2022, p. 171). Transformative sustainability research thus entails acquiring ‘transformation knowledge’ for understanding ‘how to intervene’ through ‘interventions, processes, pathways, and levers’, as well as identifying ‘where to intervene’ through key leveraging points (Horcea-Milcu et al., 2024, p. 3). Here, we conceptualize these interventions through social processes of influence that contribute toward disaster resilience and wider sustainability. Radical transformative change often builds on the synergy of smaller scale changes that create

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social processes. These synergies lead to localized changes, out of which 'radically new configurations and practices can emerge' to influence institutional-level change (Bousquet *et al.*, 2016, p. 8). In other words, there are possibilities for transformation to occur as a form of incremental change through pathways developed from adaptive responses to risk that can open up novel opportunities for policy change (Pelling *et al.*, 2015). These pathways can be shaped by step change cycles in expansive learning through the questioning and reformulating of current practices (Engestrom, 2000).

Reorienting individuals' understandings and beliefs in a transformative way is a huge undertaking, and it is therefore imperative to understand the processes by which such transformation can take shape (Horvath, 2020). However, there is a lack of understanding in the academic literature regarding the small-scale social processes involved in building transformative capacity for sustainability (Leventon *et al.*, 2023) and resilience to disaster (Saja *et al.*, 2021a). Transformation can be understood to occur at individual, collective, and systemic (structural) scales (Naito *et al.*, 2022). However, despite this understanding, most sustainability and resilience frameworks do not account for the relationality that influences change within and across all of these different scales to fully appreciate how this can determine broader societal transformation (Naito *et al.*, 2022).

This conceptual review offers a qualitative conceptual synthesis of social practices and relational agency as a social influencing process associated with disaster resilience. It addresses two research questions: 1. What are the social practices that influence transformative change for disaster resilience in the context of individual, collective, and structural spheres of influence? 2. What are the social influencing processes involved, as identified through relational agency? Although the analysis includes a structural element, the review predominantly focusses on exploring social processes that accord with agentive rather than an institutional or wider systems-thinking approaches. It is therefore mostly reflective of an 'enabling' approach to transformation involving the harnessing of 'human agency, values and capacities necessary to manage uncertainty, act collectively, identify and enact pathways to desired futures' (Scoones *et al.*, 2020, p. 68). The process-based approach to this analysis aligns with a definition of social forms of resilience as the 'ability of social mechanisms' to respond and cope with adverse events (Saja *et al.*, 2021a).

Conceptualizations of community resilience to disaster over the last two decades have become increasingly centered on the role of human agency as opposed to structure, representing an epistemological shift in focus, expressed through a range of approaches. These include the analysis of adaptive capacities (Norris *et al.*, 2008) and sustainable livelihood resources or capitals (DFID, 1999), applied across social, economic, and environmental systems (Gaillard *et al.*, 2018) as a way of transforming societies for increased resilience. With this expansion in resilience literacy has come new challenges, including a need to understand the complexities involving social processes associated with a sense of place, human identity, ethic of care and responsibility for others. Moreover, when it comes to ideas of transformative sustainability, systemic or structural approaches that tend to focus on the big picture have been found to often overlook individual practices that are an essential and diverse part of the underlying functioning of social structures (Naito *et al.*, 2022). Instead these social structural approaches assume that structural changes will be sufficient for redirecting human actions (Shove *et al.*, 2012). However, this is often not the case in practice (Naito *et al.*, 2022). This oversight in ways of accounting for social

practice and agency also negates the role of individual agency and relational dynamics at a collective level. Thus the following section illuminates how social practices and relational dynamics represent important social influencing factors in creating transformative potential for enhanced sustainability through community disaster resilience building.

2. Enacting social processes of disaster resilience for sustainability transformation

Building capacity for sustainability takes place amongst individuals and collectives in the form of dynamic and shared social processes reflective of complex iterative relations between ourselves and others (Ardoin *et al.*, 2023). Social resilience is reflective of social sustainability, which incorporates ideas of 'human well-being, equity, democratic government and democratic civil society' (Magis & Shinn, 2008, p. 38). It can therefore be argued that building resilience to disaster equates to developing the capacity of individuals, communities, and social structures for enhanced sustainability through the transformative capacity of social practices.

This transformative social capacity represents a defining dimension of social resilience, which is often identified through participation in social actions such as: social networking, identifying with place and creating a sense of belonging (Rindrasih, 2018). Nevertheless, social sustainability has been described as the 'forgotten pillar' of sustainable development (Opp, 2017) and like social resilience, is conceptually underdeveloped (Henly-Shepard *et al.*, 2015; Saja *et al.*, 2019; Wolff & Ehrstrom, 2020). Social resilience is inextricably linked to the sustainability for communities, particularly in the context of disasters, whereby resilience assumes an inherent requirement for communities to self-organize, adapt and manage their resources in the face of adversity in a self-sustaining way (Ricciardelli *et al.*, 2018).

Contemporary conceptualizations of resilience have their origins in the physical sciences and are typically indexed to the concept of equilibrium. These then shifted to dynamic states of resilience (Holling, 1973) and social-ecological systems (SES) approaches (Folke, 2016) to more recent transformative understandings (Manyena *et al.*, 2019). This evolution in understandings of resilience has resulted in a multitude of definitions and frameworks that can create confusion for policy-making, practices, and evaluation. The usefulness of resilience as a concept, therefore, depends upon the ability to align it to the specific research context in question (Weichselgartner & Kelman, 2014).

Bousquet *et al.* (2016, p. 40) conceptualize resilience as either belonging to a 'socio-ecological systems' or 'development resilience' approach, with the latter being defined as the 'capacity over time of a person, household, or other aggregate unit to avoid poverty when faced with various stressors and in the wake of myriad shocks.' The community development conceptualization of resilience is particularly relevant to community resilience building through agentive social processes. It is difficult to settle upon one meaningful definition of resilience, however, the understanding proposed by Schetter and Dolbier (2011) in the context of stress and health, whereby individuals draw upon a range of resources to cope with, adapt to, and positively transform their positions is fitting for this review, noting that the notion of resources includes relations with others to shape social practice within a local environment.

Recently there has been an increased focus in the academic literature on social resilience and its defining processes, but as mentioned earlier these processes are not well defined (Saja *et al.*, 2021a, 2021b). Social processes such as the forming of social

groups and networks have been widely applied in the study of community resilience through the building of social capital (Aldrich & Meyer, 2015; Cox & Perry, 2011) to generate capacity to transform communities and bolster the conception of resilience as a capacity to ‘bounce forward’ (Parsons et al., 2016). However, a downside of these social capital analyses is that they tend to describe all of the social characteristics and dynamics that take place within a community in a way that represents individually bounded constructs (Rodriquez et al., 2022) rather than dynamic interrelational social processes. This has resulted in an oversimplification of what most likely entails very intricate and complex shifting of dynamic social processes, and sub-dimensions that shape and transform social groups through differing beliefs and social networks (Ssenoga et al., 2022).

Despite a progressive increase in studies of resilience and environmental sustainability (Folke, 2016), few have managed to highlight integration across all systems or sector streams of knowledge or acknowledge the complexity of communities and broader social systems (Berkes & Ross, 2013; Magis & Shinn, 2008; Xu & Kajikawa, 2017). There is a need therefore for research to inform a move towards a paradigm of disaster resilience that acknowledges a fuller appreciation of the transformative relational interplay between environmental, social, and economic systems (Davoudi et al., 2012; Henly-Shepard et al., 2015; Wardekker, 2021).

Social processes of disaster resilience denote social shifts or (transformations) which can be explored through dynamic relational processes, especially as they can reveal how new social capacities can take shape, reshape, and transform individuals, collectives and wider society in the face of adversity (Parsons et al., 2016). Meriläinen et al. (2022), for example, adopted relational ontologies to explore disaster resilience and described disaster not as a single event but as a plurality of connected, relational and intersubjective interactions. Our conceptual framework for transformative change draws upon the concept of transformative sustainability Naito et al. (2022) describe through a Sphere of Influence Framework that represents the function of interactions of ‘human practices and social structures that can influence one another’ (Naito et al., 2022, p. 173). Our aim is to advance this framework by taking a deeper look at the role of relational agency in influencing social practices across the three spheres of influence. So, in this analysis, we explore the social practices and relationality that can occur as social processes of resilience, grounded in a conceptual framework of relational agency and social influencing processes that comprise the structure of social practice. We conceptualize the spheres of influence as *individual* (personal attributes), *collective* (collaborative action for shared goals) and *structural* (change to policy, process and governance).

3. Conceptual framework: relational agency and social practice

Human agency and behavior are driven by beliefs, values, and personal choices (Shove et al., 2012) as well as processes of self-reflection that include how we perceive our capability to perform certain actions (Bandura, 1986). Human agency, which influences identity formation and development, is not a static concept but a dynamic one that involves an ongoing process whereby individuals construct and reconstruct their life histories through modified self-narratives. This revision of self-narrative, or (re)storying, takes place within a context and materiality of otherness, which implies that agency is also relational in its determination. Here we seek to expand on this relational understanding of personal agency through an emphasis on the orientation of social and

relational processes that underscore how we mediate narratives of self, and ‘selfing.’ Such relationality highlights interrelations with others and therefore moves the ontological focus from the subjective to the intersubjective. A relational ontology supports a worldview that human and non-human materialities are interconnected and interdependent (Ceder, 2019) and can promote a sense of ethical responsibility for others (Ceder, 2019), which is necessary to build social resilience and sustainability.

Our conceptual framework also draws upon educational theory relating to the concept of ‘relational agency’ as described by Edwards (2005), and sociological theory with regards to the dynamics of social practice described by Shove et al. (2012). In brief, when individuals ‘(re)story’ themselves and the trajectories of their lives, as is often required following a disaster, this process can have the effect of influencing how individuals perceive, and respond, to their experiences (McAlpine & Amundsen, 2009). For individuals who have experienced disaster, the experience can either positively or negatively impact upon the ability to develop a revised self-narrative, through the influence of associated emotions with the experience and unique individual sensitivities involved (Da-Hye et al., 2020). This (re)storying process and revision of a self-narrative, however, does not occur in isolation and is derived from how we relate to others and the world around us. The generation of relational value is important for human identity and can occur as a personal relating (often through attachment) to a particular place, creating a sense of identity and belonging (Luque-Lora, 2022). Relational value is therefore identified as social relations that aim to achieve a clear ‘instrumental outcome or goal’ or to foster ‘caring citizens’ (i.e. an ethic of care for others), which moves the relational value from an intrinsic positionality to an extrinsic positionality (Ceder, 2019).

Although some scholars (see Luque-Lora, 2022) argue that relational value in itself does not exist as a distinct entity, due to perceiving it as dependent upon its inherent value across instrumental and intrinsic valuing of concrete objects, we conceptualize relational value as constitutive of value in its own right owing to its capacity to generate value through relational agency, which can be harnessed as a resource (Edwards, 2005). Thus, the relations themselves represent the axiology for generating resilience within communities (Quinn et al., 2020) through a holistic, interrelational understanding of the world (Booth, 2013).

Communities often respond (or transform) in the context of a disaster through forms of social practices that involve a relational capacity to work with others to harness resources and distribute them across systems (Gaillard et al., 2018; Pormon & Lejano, 2023). This form of interrelating, which can expand human capacity for resilience, is expressed as an expansion of ‘relational agency’ (Edwards, 2005). Edwards (2005) proposes that relational agency occupies both the conceptual space between enhanced individual understanding and social transformation, and it is therefore a useful theoretical lens for our analysis of social resilience through individual and collective dispositions and transformative pathways for sustainability.

Relational agency, in the anthropocentric sense, involves a capacity for interrelations with others, and its value is realized when (through relating with others) a capacity for relational agency ‘expands’ the object of focus that a person or collective is trying to transform through the granting of access of resources or tools that others can bring to the table (Edwards, 2005). This relational agency can translate into transformative agency when ‘purposeful changes’ to types of activities are made (Engestrom & Virkkunen, 2007) and these may include interactions between human and non-

human resource flows, which in turn are shaped by historical and cultural relating in a process of ongoing transformation (Stetsenko, 2005). By focusing on the relational capacity for undertaking negotiations, we can ‘deduce understandings of resource negotiations and distributions’ (Edwards, 2005, p. 173).

The process of meaning-making for instituting societal change can stem from a complex interplay between biophysical, social and cultural contextual factors, and therefore it occurs through a processual framework of social and material interrelations that shape and reshape human lives (Frie, 2008, p. vii). Within this framework relational agency can be mediated through the key elements within a structure of social practice (i.e. community resilience building) in what Shove et al. (2012) describes as social structures comprising: *competencies* (e.g. knowledge, skills, and capacities), *materials* (e.g. objects, infrastructures, tools, and technologies), and *meanings* (e.g. social norms, values, cultures, and motivations) that interact to influence new social practices. Social practices, therefore, are shaped by complex and diverse interrelational processes and it is through these ongoing practices that social structures are sustained, stabilized, and disturbed (Shove et al., 2012).

When heterogenous entities, such as human beings and their individual beliefs and identities, merge into a unified and homogenous focus of activity defined by the rules and regimes of the ‘practice’ itself (Shove et al., 2012), the conditions are present for relational agency to be created. To transfer this idea to the social context of a disaster: when heterogenous human beings come together within collectives, social practices can take shape around a boundary of shared understandings to generate collective agency through a common ethic of care and a sense of purposeful action for rebuilding the local community or landscape. According to Dewey (1938, p. 69), known for his pragmatist philosophy of learning through the social practice of experience, developing a sense of purposeful action involves three core aspects: (1) observation of the surrounding conditions, (2) knowledge based on prior experience, and (3) a judgement of how to put 1 and 2 into action. This sense of purpose can be achieved through relational agency, created through shared goals, which has the potential to evolve into civil engagement with institutional regimes that can influence social structures and ultimately reshape social policy and systems via changes to positional agency within these systems (Daniels, 2016).

The analysis that follows draws on the idea that social practices are defined by interdependent relations between materials, competences, and meanings, which enhance relational agency for disaster resilience as a pathway to sustainability transformation. The social practice of concern here is disaster resilience situated within a relational ontology. *Competencies* in this conceptual framing are represented as relational competencies through the shared knowledge, skills, and capacity that provide for the ability to relate to other people, which is mediated through *materials* (i.e. social, physical, and symbolic disaster-related artifacts and objects) and *meaning* (i.e. a sense of self (re)constituted through these relations with others to form a new self-narrative of what it means to be in the world as a subject of disaster). Through this relational and social conceptual framework, an analysis unfolds that develops into a Sphere of Influence Framework for resilience and sustainability transformation.

4. Method

4.1 Research design

This review does not seek to provide a comprehensive analysis of existing literature on disaster resilience and sustainability

transformation and instead offers a conceptual qualitative synthesis of relevant literature selected on the basis of aligning to the research questions and conceptual framework. Our approach then represents a ‘qualitative interpretive synthesis’ designed to generate a synergy of findings from a ‘group of studies on a related topic to provide an enhanced understanding of the topic’ (Aguirre & Bolton, 2014, p. 283). The research questions were guided by the PICO framework (Problem–Intervention–Comparison–Outcome) (Twa, 2016) to generate focused research questions for improved review outcomes:

Problem: The need to understand how agentic social processes of disaster resilience can transform structural outcomes for sustainability.

Intervention: An application of relational agency and social practice conceptual framework synthesized through a Sphere of Influence Framework.

Comparison: Comparison of social processes takes place relationally across individual, collective, and structural scales.

Outcome: A Sphere of Influence Framework that reveals the value of relationality for influencing social practices for disaster resilience as a resource for enacting transformative pathways for sustainability.

4.2 Literature selection

Due to the conceptual nature of the review a focused and purposeful approach to corpus generation was adopted, particularly given the breadth and wealth of resilience and disaster scholarship that exists. This resulted in database searches that combined three different sets of keyword searches to ensure a tailored but robust coverage of up-to-date research:

1. A focused Web of Science (all databases) and Scopus search to generate publications on the social practices of resilience.
2. A broader Web of Science (all databases) key word search to capture a wider set of research containing empirical datasets.
3. A specific and focused Web of Science (all databases) search to generate prominent research covering relationality and disaster resilience that was followed by bibliographic snowballing.

The final set of 69 documents, which includes peer-reviewed journal articles, books, book chapters, and conference papers (see Figures 1 and 2) can be found in the supplementary material.

4.2.1 Database search protocol

Identification and Screening

First Keyword Search: This involved a focused Web of Science (all databases) and Scopus search using keywords: ‘disaster resilience’ AND ‘transform*’ searched for in ABSTRACTS for the period, 1 January 2010 to 1 January 2023. Documents were screened for their relevance to community resilience in the context of natural hazards and the Web of Science topic fields were used to screen out documents that did not relate to natural hazards, such as those predominantly medical or psychological in focus.

Second Keyword Search: This involved separating the keywords ‘disaster’ from ‘resilience’ to capture a wider set of publications. ‘Community’ was added due to the conceptual focus on agentic social processes as opposed to socio-political structures. This resulted in the following keywords: ‘disaster’ AND ‘resilience’ AND ‘transform*’ AND ‘community’ all searched for in

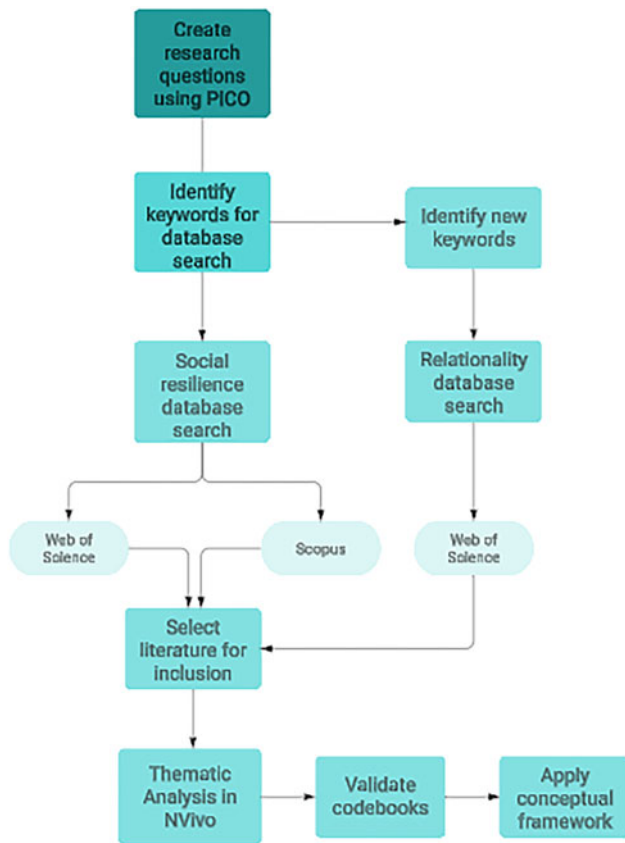


Figure 1. Overview of the research approach.

ABSTRACTS from 1 January 2014 to 1 January 2024. Documents were screened using the same process as the first keyword search.

Third Keyword Search: A follow-up database search was undertaken to generate additional literature with a specific focus on relationality and community disaster resilience. This was scoped to Web of Science (all database) using a targeted TOPIC search of ‘community disaster resilience relationality.’ The search was restricted to peer-reviewed documents published within the last five years (2019–2023) to extract recent understandings. It identified five publications (Baumann & Moore, 2023 and DeVerteuil et al., 2021; Meriläinen et al., 2022; Pormon et al., 2023; Quinn et al., 2020), which were used as a starting point for bibliographic snowballing. Six additional publications were sourced via backwards bibliographic snowballing (see Wohlin, 2014) using the reference list in Quinn et al. (2020). Quinn et al. (2020) represented the most cited document out of the five publications with 18 citations compared with the others, which had 0–5 citations. Bibliographic snowballing can be useful when trying to identify specific or difficult to reach data and was deemed appropriate for this study because of the emerging nature of the topic area.

Inclusion and Selection

First keyword searches: Documents were scanned and excluded if they did not meet key inclusion criteria (e.g. contained a focus on: community resilience, social transformation, or any derivative of transformation, and went beyond a focus on institutional or policy and structural analyses). For example, documents were excluded if they had a focus relating to broad ideas of social processes not involving human agency (e.g. socio-economic, socio-ecological, and socio-political). While documents were

selected when they included a discussion of the human and agentive social processes of resilience such as: social learning, social networks, social connection, place identity and belonging and community engagement and participation.

Second keyword search: Documents were scanned for the same inclusion criteria for the first keyword searches with the additional inclusion criteria that they included empirical data.

Third keyword search: Further shortlisting was not required as the 11 documents were identified purposefully via snowballing.

Country representation: The empirical studies in the sample included research in the following countries: Australia, New Zealand, China, Taiwan, Indonesia, Bangladesh, Philippines, Japan, Myanmar, India, Uganda, South Africa, Germany, Netherlands, USA (including Hawaii), Canada, Iran, Chile, Vanuatu, Kenya, Zimbabwe, South Sudan, and Nepal.

4.3 Content analysis and coding frameworks

4.3.1 Identifying the social processes of disaster resilience for transformative change

The initial analysis involved examining the empirical studies in the sample relating to social processes of resilience to identify how researchers defined or discussed these social processes in relation to individual, collective, and structural spheres and to explore the different ways that these social processes were conceptualized as contributing to transformative outcomes (Table 1). This provided a snapshot of the diversity of approaches, which helped frame the second part of the analysis and Sphere of Influence Framework.

4.3.2 Identifying the social practices and relationality of disaster resilience

The exemplifications of social processes were identified through reflexive thematic analysis (Braun & Clarke, 2021), which involved an assessment against commonly reported dimensions and descriptors of social resilience identified through the literature review. For the identification of the social influencing processes and social practices involved in the context of a disaster (mostly post disaster recovery related), documents were thematically coded using the qualitative data analysis software, NVivo.

The coding framework was developed via a three-step process that involved inductively identifying a comprehensive set of social themes, refining, and validating the identified themes, and conceptualizing a consolidated set of broad themes that could be described as the social practices of resilience building at a community level. Step one involved scanning and speed-reading publications to build familiarity with content. Preliminary word searches using ‘social’ were undertaken to identify initial social coding constructs. In step two, word and phrase searches were carried out in NVivo (using exact terms and stem words) to identify specific ‘social’ constructs preceded with ‘social’ (e.g. ‘social learning’, ‘social media’, ‘social cohesion’). Step three entailed additional searches using broader social constructs relating to social sustainability that emerged from deeper familiarity with the literature (e.g. place, identity, health and well-being, participation, equality, meaning, socio-cultural, and socio-political).

A coding validation process was undertaken with co-authors to construct the final coding framework and reduce researcher bias. Codebooks were created for ‘social resilience’ and ‘transformative resilience’ to help identify the extent to which the literature was using these as a focus. Key themes of individual and collective social practices for resilience were identified,

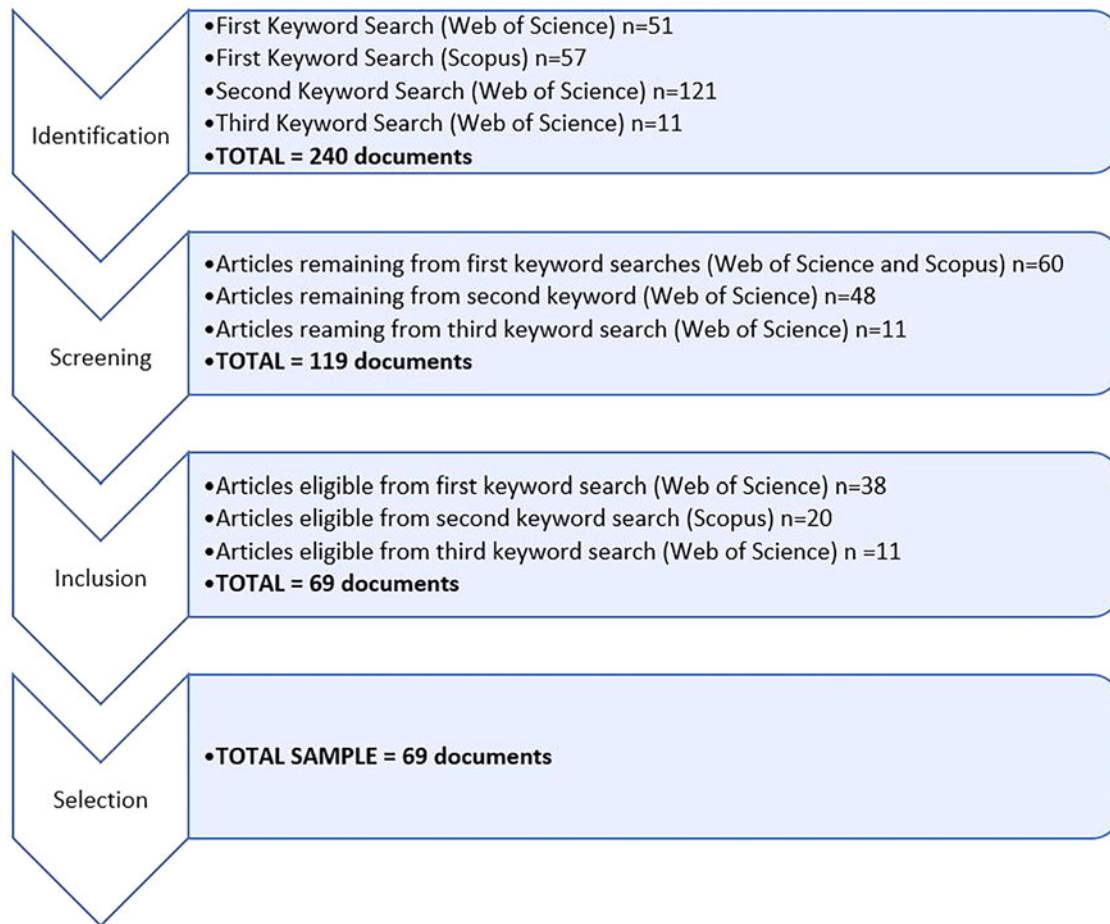


Figure 2. Literature identification and selection process.

which excluded broad universal or institutional constructs that were not specific to agentic social processes and therefore not a key focus of this conceptual review (e.g. general ideas around health and well-being). The second part of the analysis applied the concept of ‘relational agency’ to abductively explore (see Timmermans & Tavory, 2012) how relationality can enhance capacity for transformative pathways for sustainability through the building of relational capacity with others. This part did not involve coding but served to qualitatively add additional evidence and support to the relation aspects of the original analysis.

5. Results

5.1 Identifying the social processes of disaster resilience as pathways for transformative change for sustainability

The purpose of this review is to offer a qualitative interpretive synthesis of how resilience building, in the context of disaster, is influenced by individual, collective, and structural social influencing processes, and how these processes interrelate to generate transformative change for enhanced sustainability. The process-based approach to this analysis aligns with a definition of social resilience as the ‘ability of social mechanisms’ to respond and cope with adverse events (Saja et al., 2019, 2021b). The first part of the review analyzed documents relating to social resilience that incorporated empirical data ($n = 37$) to consolidate existing approaches and conceptualizations (see Table 1).

Table 1 illustrates how researchers describe transformation in various ways within highly specialized research contexts. The social processes for transformation identified include: *community engagement, community connection, ethic of care, reorganizing in the face of change, the ability to apply technological solutions, harnessing opportunities for new practices, knowledge integration, and social learning*. However, an observable gap is that the transformations identified are not articulated in terms of *how* the social processes within the different spheres of influence interact relationally with each other to influence structural transformative change. This finding is observed even for the studies that chose to focus on the broader systems and structural/institutional aspects of transformative change and supports what Naito et al. (2022) identified: *that sustainability frameworks that depict transformative change commonly do not integrate individual agentic processes with structural processes*. This also supports what Choudhury et al. (2024) identified across studies in terms of a lack of a feedback loop between policy and community practices. The analysis in Table 1 demonstrates that the empirical studies are, albeit with a few exceptions, either focused on both individual and collective spheres or wider social systems and socio-political structural spheres, but for the most part, do not include a relational analysis across all three spheres. Some studies, such as Beilin and Paschen (2021) and James (2016), did explore the social processes that influence resilience within individual, community, and structural spheres through the inclusion of a policy analysis, but these did not integrate the analyses relationally across all spheres.

Table 1. Social resilience processes and pathways for transformative change

Author	Resilience definitional approach	Focus on individual influencing processes	Focus on collective influencing processes	Focus on structural influencing processes	Social resilience pathways for transformative change
Azad et al. (2022)	Community development		✓	✓	Transformation occurs when local institutions (formal, informal, and quasi-formal) create learning arenas that translate social learning into collective action
Bacud et al. (2014)	Social-ecological systems	✓	✓		Increased individual knowledge capabilities, daily social interactions, shared meanings and self organization for risk awareness increases transformative processes for resilience
Beilin and Paschen (2021)	Community development	✓	✓	✓	Transformation is achieved through relational processes of community engagement through communitarianism that enable citizens to be 'response-able'
Benitez-Avila et al. (2023)	Community development	✓		✓	The social positions and socio-economic status determine individuals' agentic predispositions to transform their life chances if faced with adversity (i.e. their Mastery)
Bunch et al. (2020)	Community development	✓	✓		Coping strategies, capacity for disaster management at the community level, and access to social capital that are important factors in resilience and transformation
Cradock-Henry et al. (2018)	Social-ecological systems	✓	✓	✓	Transformation is seen as multi-level, iterative adaptive cycles that exploit change pathways to cope with shocks and react to disturbances
Choudhury et al. (2024)	Community development	✓	✓	✓	Transformation is achieved through a process of learning across multiple and interconnectedness societal levels
Elkin and Keenan (2018)	Social-ecological systems			✓	Autonomous management of the cultural, environmental and economic adaptations of coastal geographies are central to transformation
Epstein et al. (2017)	Social-ecological systems	✓	✓		Transformation is enacted through traditional practices of agricultural livelihood systems
Haque et al. (2022)	Community development		✓	✓	Transformation occurs when innovative adaptation strategies lead vulnerable communities to take up social learning-based actions
Henly-Shepard et al. (2015)	Community development	✓	✓		Transformation takes place through scientific solutions that marry place-based with socio-culturally relevant processes
James & Paton (2015)	Community development		✓	✓	Transformative change is identified as the empowerment through local governments and domestic civil society organizations working in the 'bottom up' participatory mode to enhance the resilience of vulnerable population groups
James (2016)	Community development	✓	✓	✓	Sociocultural features that originate in traditional networks of religion, art, dancing, song, feasting and life's celebrations are more significant for transformation for the long term than physical reconstruction
Jiang et al. (2021)	Social-ecological systems			✓	Transformation occurs through dynamic capabilities. A new resilience-building element of facilitating disruptive changes after a disaster is proposed that enables organisations' ability to transform the business model and facilitate disruptive changes in an uncertain environment
Jozaei et al. (2022)	Social-ecological systems			✓	Social-ecological resilience is essential for social vulnerability analysis to adapt or transform in the face of accelerating environmental change

(Continued)

Table 1. (Continued.)

Author	Resilience definitional approach	Focus on individual influencing processes	Focus on collective influencing processes	Focus on structural influencing processes	Social resilience pathways for transformative change
Levy (2016)	Social–ecological systems			√	Transformation is achieved by capitalizing on opportunities provided by human creativity, diplomatic openings, technologic capacities, and environmental change
Lin & Lin (2020)	Community development	√	√		Culture can reduce disaster risk through a transformation to a livelihood source as the basis of community resilience
Ma et al. (2023)	Community Development	√	√		Transformation is enacted through an ethic of care and connection
McNamara et al. (2017)	Community development	√	√		Transformation is achieved through rebuilding livelihoods to enhance long-term financial resilience
Muchiri & Opiyo (2022)	Community development	√	√		Locally designed and implemented initiatives and children play a key role in transformative climate resilience through human behavioral change toward pro-environmental deeds as a pathway to transformation
Nakamura et al. (2019)	Community development	√	√		Transformation is achieved through social learning and a change in beliefs and value systems regarding the roles of government and academia
Nian et al. (2019)	Community development	√	√		The local tourism community gradually transforms the negative aspects of disasters into development opportunities, particularly through participation
Patch (2020)	Community development		√	√	Transformation is achieved through social and community engagement, governance, and leadership through learning and the ability to adjust policies and procedures to transform practices
Rindrasah (2018)	Social–ecological systems		√	√	The availability of innovation that is acceptable to the local community, and the supply and marketing of tourism resources are key enabling factors for tourism transformation and becoming part of the post-disaster recovery strategy, thereby enhancing resilience
Rindrasah (2019)	Community development		√	√	Transformation is achieved through community-based tourism integrated into recovery processes following disaster
Ross et al. (2024)	Social– ecological systems			√	Social capital, including building trust relationships between communities and government agencies, strengthening networks and partnerships, and working toward knowledge systems that are egalitarian and open to diverse values are key for resilience transformation
Singh-Peterson et al. (2015)	Social–ecological systems	√	√	√	For resilience metrics to have utility and provide meaningful information to decision-makers, they need to be embedded within local contexts, be integrated across spatial scales, and address the community's capacity for adaptation and transformation
Smith & Lawrence (2015)	Community development		√	√	Transformation took place via collective community capacity, and the relationships between various entities (community agents, businesses, and local government) and the mobilization of personal networks provided the framework for purposeful decision-making leading to a successful outcome in relation to ensuring food supply and community well-being
Ssennoga et al. (2022)	Community development	√	√		Transformation is achieved when disaster management is inclusive of people with disabilities, which increases socio-economic transformation

Taiban et al. (2020)	Community development	√	√		Social resilience occurred through the cultivation of red quinoa, a traditional food crop. Villagers rediscovered the cultural value of food through small changes in farming practices and knowledge, social network and social learning, leadership, and innovation-aided recovery that resulted in a transformative outcome in the form of the Academy of Special Rukai Crops
Tan et al. (2020)	Social-ecological systems	√	√		Transformation occurs through the ability to manage emergencies after the household has returned to its original state. This ability stems primarily from psychological adjustment and iterative learning
Tasic & Amir (2016)	Community development	√	√		Transformation occurs when informational capital, strong community bonds and ties are transformed into organized information that effectively facilitates collective action to face the emergency crisis
Tsai & Lee (2022)	Social-ecological systems	√	√	√	Transformation occurs through learning for change and uncertainty, diversity for renewal and reorganization and combining different kinds of knowledge learning, showing that the community can learn from and adapt to disaster risks to strengthen community resilience
Uddin et al. (2020)	Community development			√	Traditional-informal as well as quasi-formal institutions were vital for rapid recovery and transformation to new local economic and livelihood trajectories. Resilience attributes that were deeply embedded in community characteristics assisted in ameliorating immediate impacts and building future capacities
Valenzuela et al. (2019)	Community development			√	To ensure that 'Build Back Better' as a transformational concept is achieved, there is a need to develop a disaster recovery strategy for the recovery of communities to ensure inclusive and sustainable development despite the impact of a major disaster
Yang (2020)	Community development	√	√		Disaster risk reduction is not enough for transformation and a holistic and comprehensive approach to development is required
Zhao et al. (2020)	Community development		√	√	Community economics and victims' livelihoods can be fostered by promoting industrial transformation and sustainable livelihoods and promoting social and psychological health development from social relations and psychological rehabilitation

Table 2. The social influencing processes associated with disaster resilience

Social practice for resilience	Primary object of mediation (physical/social)	Illustration of associated social meaning-making	Markers of social processes fostering relational agency	Relational competence	Sphere of influence
(Re)storied identities	Altered physical and social landscape	An ability to assimilate a revised personal vision of the future into past held visions	Revised self-identity develops through relational feelings of hope and shared values with others	Developing a meaningful and purposeful self-narrative	Individual
Resource access	Livelihood resources	Purposeful identity maintained through livelihood resource access	Self-sufficiency in accessing traditional livelihood resources (i.e. farming, fishing and tourism)	Flexible strategies for resource access	Individual
Connection to others	Traditional practices	Maintenance of cultural, social, and traditional identity through familiar practices	Participation in traditional cultural practices (e.g. religious ceremonies, rituals, and celebrations)	Maintaining traditional practices	Individual
Ethic of care	Altruistic worldview	Creation of a newfound moral sense of purpose to help others	Feelings of empathy are created through shared and emotional experiences with others	Sense of responsibility	Individual
Social networks	Reorganized or new networks	Shared experiences generate shared beliefs and values	Networks are organically formed to enhance capacity for action	Positive action for change	Collective
Communitarianism	Increased place-based connection	Sense of bonding and collectivism through shared experiences	Support generated from family and existing and new friends	Solidarity	Collective
Social protection	Social support structures	A sense of physical and psychological safety through community support structures	Ability to access welfare resources and support structures (e.g. healthcare, schools and churches)	Wellbeing	Collective
Knowledge capabilities	Social media	Local agents mobilize as experts to transmit relevant information to the local community	Ability to access and engage with IT	Empowered action	Collective
Civic participation	Formalized political engagement	Collective advocacy for enhanced decision making	Proactive political advocacy through formalized channels or arrangements	Political representation	Structural

5.2 Exceptions to the rule: intersectionality across three spheres of influence

In this section we discuss the minority of studies that included a relational analysis across all three spheres of influence to highlight intersectionality possibilities and realities.

First, Tsai and Lee (2022) included an analysis across all spheres through the application of historical geography, political economy and community resilience theory to explore local reorganization following disaster in Taiwan. Their study found that disaster resilience is rooted in historical social processes of land reclamation dating back to the early 17th century and is heavily influenced by cultural practices and beliefs of the Hakka ethnic group. Their analysis also highlights how these social processes occur in tandem with top-down structural political and economic interventions that can influence residents' awareness of risk and community resilience in a negative way, particularly when economic objectives dominate.

Second, Choudhury et al. (2024) analyzed how learning takes place in a disaster context across all three spheres and this enabled them to identify key opportunities and barriers across feedback loops for transformative change. For example, their study highlighted factors, such as ineffective local disaster management committees and lack of attention to local learning by decision makers as impediments to transformative change in Bangladesh.

Their findings also identified collaborative approaches, based on partnership, as a key pathway for positive transformative change.

Third, Cradock-Henry et al. (2018) explored community resilience in a rural setting in Aotearora, New Zealand, in relation to agriculture, food harvesting, production, and distribution. They demonstrated that these processes are taking shape with the transformative potential to enhance regional food security and highlight how globalized supply chains influence this dynamic at a local level through the loss of local jobs. They also identified that volunteerism is being overlooked as a recognized process of influence for transformative change.

Looking across all three studies, from a structural (policy) perspective assessing the different components of community resilience at different spatial scales proves an innovative yet practical approach that can inform strategic policies and programs designed to enhance resilience (see also Singh-Peterson et al., 2015). These exceptions to the rule highlight the explanatory power of analyzing the three spheres of influence relationally, and offer a more informed account of the intersections of social and relational dynamics including how they interact to enhance or hinder transformation.

5.3 The social practices and relationality of disaster resilience

The analysis summarized in Table 2 describes how social practices are shaped through relational agency through forms of meaning-

making, competencies, and materiality developed and expanded as a capacity within individual, collective, and structural spheres of influence. The structural sphere represents the entry point for societal transformation through the shaping of new policies, governance structures, and practices. To reiterate, here social resilience refers to the social processes or mechanisms that take place across these three spheres of influence. The first column in Table 2 consolidates the social practices identified for disaster resilience building to describe the most commonly discussed social resilience dimensions in the selected literature. The second column highlights the specific social or physical objects through which associated relational dimensions are mediated. The third illustrates the types of social meanings that are created through these social practices. The fourth describes how relational agency is *expanded* and the fifth names a relational competence borne out of these social processes. The final column identifies the individual, collective or structural spheres of influence where the processes take place. Within the context of disaster resilience and this analysis, these social processes are set within a relational framing of *competencies* (e.g. capacity, skills, and knowledge to relate to other), *materials* (social and physical objects or artifacts where relations are mediated) and *meanings* (the ability of individuals and collectives to look to the other for a new-found purposeful meaning that becomes integrated into a new self-narrative and identity).

6. Discussion

The knowledge gap we sought to address through this review was the limited qualitative understanding of how agentic social processes and relational factors involved in building social forms of resilience can shape transformative outcomes for increased sustainability. In our discussion, we focus on how processes of relationality (relational agency) influence social practices in the context of disaster resilience, which have the potential for creating transformative pathways for sustainability. The following three sections are centered around the three spheres of influence (individual, collective, and structural) for building resilience in communities in ways that can also generate pathways for sustainability transformation.

6.1 Individual sphere of influence

Disasters disrupt social systems and their everyday function, shifting people's livelihoods, access to services and familiar supports and routines that promote coping and resilience. Disasters often dislocate people from their familiar surroundings and community, which can jeopardize a sense of self. However, self-identity can be reorganized through positive processes of relating between individuals and place following disaster, which can create a shift from a dominant materialistic worldview to a new altruistic worldview (Beilin & Paschen, 2021). This altered worldview modifies human relationships when a sense of responsibility is enacted to build a sense of purpose toward the local community. Such processes become central to creating a meaningful sense of self-identity (Nava, 2022) prompting the reinforcing of altruistic values and beliefs and an increased ethic of care for community, which is an important aspect for developing community motivation for rebuilding and reconstruction (Beilin & Paschen, 2021).

Our findings suggest identity and sense of self were key constructs that need to be restored or (re)storied through a reconceptualization of self and the 'mutual obligations' to care for familiar places and those who inhabit them. Thus this identity reformulation was often generated from relational agency in the form of

generating an 'ethic of care' for a common other, exemplified in the disaster context by a focus on people and place (Beilin & Paschen, 2021). This relational process acted as both a mediating and moderating role between risk perception, coping, and determining whether to stay and rebuild (Sennoga et al., 2022). In the period following the disaster the social practice of creating temporary shelters was often deemed vital as these shelters represented an immediate substitute for a lost community, materially and socially, toward a new sense of community through place-making and the sharing of common experiences (James, 2016). This practice of sharing experiences is especially essential for vulnerable or isolated individuals dispossessed by disaster. Localized rebuilding and reinhabitation processes generate relational agency through the ability of individuals to engage in this relational process of shared experiences in often traumatized communities, which itself can buffer against initial reactions to unfamiliar and hostile disaster landscapes (Beilin & Paschen, 2021).

The ability to turn outward to face the realities of the new disaster landscape can be pivotal to the creation of temporary, novel, and transformed cohesive social fabrics, whose presence can in turn help predict future resilience (Twigger-Ross et al., 2011). This is assisted especially if relational agency is composed of perceptions of respect and trust and good quality relations (Quinn et al., 2020). The loss of familiar friends, family, home, familiar artifacts, and surroundings can lead to a confused sense of identity and self-purpose within an unforgiving disaster landscape where relationships between the self and a familiar place are shattered. Relations with others are crucial for the construction of personal identities that can influence social practices for the distribution of collective assets and livelihood resources to rebuild a positive future (James, 2016).

In James' (2016) study of reconstruction models operating in China, Iran, and Myanmar, exploring social factors influencing resilience following disasters, key social support assets of survivors were identified as being reshaped around families, schools, communities, and youth, including in the form of Buddhist ceremonies, which provide the opportunity for the community to mourn and celebrate. The co-creation of rebuilding can result in a stronger sense of identifying with place, which can result in place-based sustainability transformations including the installation of solar panels and advocating for rebuilding schools back better (James, 2016). This rebuilding can generate a positive sense of self-identity through the achievement of a common goal through the shared tasks faced by those affected, and can nurture feelings of altruism and provide opportunities for generosity and meaningful purposeful work (Lidskog, 2018). Similarly, McNamara et al. (2017) showed the importance of social relations within women's collectives for the reconstruction of livelihoods and financial resilience. NGOs and governments should seek to integrate these aspects into development policy (James, 2016) whilst taking the opportunity to reflect on how this can enhance sustainability transformations. For instance, local hiring practices and private contracting could be practiced within local contexts, when feasible, to encourage the 'co-creation of place-based sustainability activities with civil society, local governments, or community partners' (Burch & Di Bella, 2021, p. 1,968) which can foster connection and sense of self and identity. The newly formed social consciousness that is formed through these common social practices is central in the link between community dynamics and well-being in times of crisis (Quinn et al., 2020), a theme we now explore in further depth.

6.2 Collective sphere of influence

A disaster can bring people into contact with each other in new and unusual ways (Quinn et al., 2020). The disaster can generate new social groups or reorganize existing groups, such as: *volunteer, rescue groups, aid providers* and NGOs (Tsai & Lee, 2022) through shared values, needs, goals, or ideologies (Paidakaki & Moulaert, 2017). Ssenoga et al. (2022) found that belonging to a social group was particularly important to increasing the resilience of those with disabilities. In this situation, social groups acted as a social platform for risk communication, social cohesion, and economic empowerment through advocacy (Ssenoga et al., 2022). The promotion of social groups spilled over into the structural sphere of influence in that it was promoted by the government of Uganda in their National Disability-Inclusive Planning Guidelines (Ssenoga et al., 2022). Azad et al. (2022, p. 329) identified that social learning for flash flooding took place within local-level 'formal and informal institutions creating opportunities for social interaction, deliberation, problem solving, and the generation of collective knowledge and action' and therefore through these social practices relational agency was expanded. Cradock-Henry et al. (2018, p. 13) also noted that transformative capacity emerges when spaces for social networks provide 'strategic and operational innovation' that can 'catalyze new types of governance arrangements and structures.' This speaks to the notion of allowing space for relational agency to expand knowledge and question existing practices in order to shift to new approaches, which can offer pathways for transformative change.

James (2016) describes how relations and roles can change as a result of disaster mortalities and this can have particular impacts on the roles and relationships between the genders (Eriksen & Gill, 2010). In this context, social resilience can offer much potential through a fostering of social connection across groups through a collective ethic of care and communitarianism to work towards common goals (Beilin & Paschen, 2021) by harnessing opportunities to work together. This coming together to solve problems or work toward common goals enables social groups to expand their capacity to effectively plan and manage disaster risk (Parker, 2020). This reshaped social practice may also lead to the transformation of other social constructs relating to identity, social connectedness, equity, belonging, and place.

Social groups and networks may respond to a disaster by reorganizing their identities through group affiliation in a way that can expand their knowledge capabilities to institute change in a positive way by formulating communities of practices bounded by common vested interests. This can create integrated knowledge systems, which can lead to political advocacy for policy change. For example, Taiban et al. (2020, p. 226) found that social resilience occurred through the cultivation of red quinoa, a traditional food crop:

...villagers rediscovered the cultural value of food through small changes in farming practices and knowledge, social network and social learning, leadership, and innovation-aided recovery that resulted in a transformative outcome in the form of the Academy of Special Rukai Crops.

However, new emerged social practices can on occasion create conditions that foster competition rather than cooperation between social groups or locales (Paidakaki & Moulaert, 2017). Thus attention should be paid to the exploration of social histories, social development, migration, culture and *indigenous*

knowledge and social and gendered identities to ensure inclusive and equitable policy decisions (Wardekker, 2021, *with emphasis*).

6.3 Structural sphere of influence

Relational agency is enhanced when good quality relationships are formed and has been shown to be vital to the success of civic participation and cooperative efforts to enable successful planning and organization (Manzo & Perkins, 2006). Understood in this way, community resilience acts a form of 'active citizenship' (Joseph, 2013, p. 42) where individuals take responsibility rather than rely primarily or solely on the actions and resources of the State. A community may be defined by a number of factors including: geography, social networks, common experience or interests or specific cultural, social or political circumstances. Community participation and forms of civic participation and advocacy are influenced by leadership and organizing processes associated with forms of engagement (Ssenoga et al., 2022) and these processes build on both individual and collective spheres of influence in the context of disaster emergencies. This civil organization can take place through social processes of reconstruction and reorganization of social support assets (e.g. schools, families, and volunteer groups) and new knowledge capabilities that are expanded for collective and societal capacity for change (Lotz-Sisitka et al., 2017). These forms of reconstruction and reorganization provide important opportunities for people to connect and relate socially through common experiences of a disaster event as a way to create a pathway for a transformed social fabric (Parsons et al., 2016). Reconstruction and reorganization can also provide channels for advocacy for resources or social justice as a pathway to transformative change for sustainability, through for instance, enhanced social welfare. The extent to which the State performs as an enabling institution, beyond its regulatory function, depends on the sense of justice forged by an institutional design advocated for by citizens (Paidakaki & Moulaert, 2017).

Imperiale and Vanclay (2021) reflected on the nature of social dimensions of community resilience for overcoming barriers to disaster risk and promoting sustainable development and argued that building a global culture of community well-being and resilience through socially sustainable risk governance is required. Transforming governance structures can occur through community participation and forms of collective advocacy, which are influenced by leadership and organizing processes associated with forms of engagement, which build both individual and collective social resilience to emergencies (Ssenoga et al., 2022). These dynamic relational processes can be calibrated to determine the reconstruction of the social assets of disaster through the reshaping of social structures such as families, schools, and local communities (Parsons et al., 2016). A key question is whether they allow people to connect and relate socially through common experiences within a specific location (Parsons et al., 2016) through the societal structures that can create formalized processes of political advocacy. Civic participation in emergent communities of practices should thus be understood within a sensitivity to the particular social contexts in which they are situated, as they involve 'dynamic and mutually constitutive relations that connect institutions and lived experience' (Henry, 2012, p. 414). Communities of practices add value to formal organizations and governments from the transfer of their unique knowledges and can become an accepted mechanism for implementing new policies and strategies through processes that influence institutional and

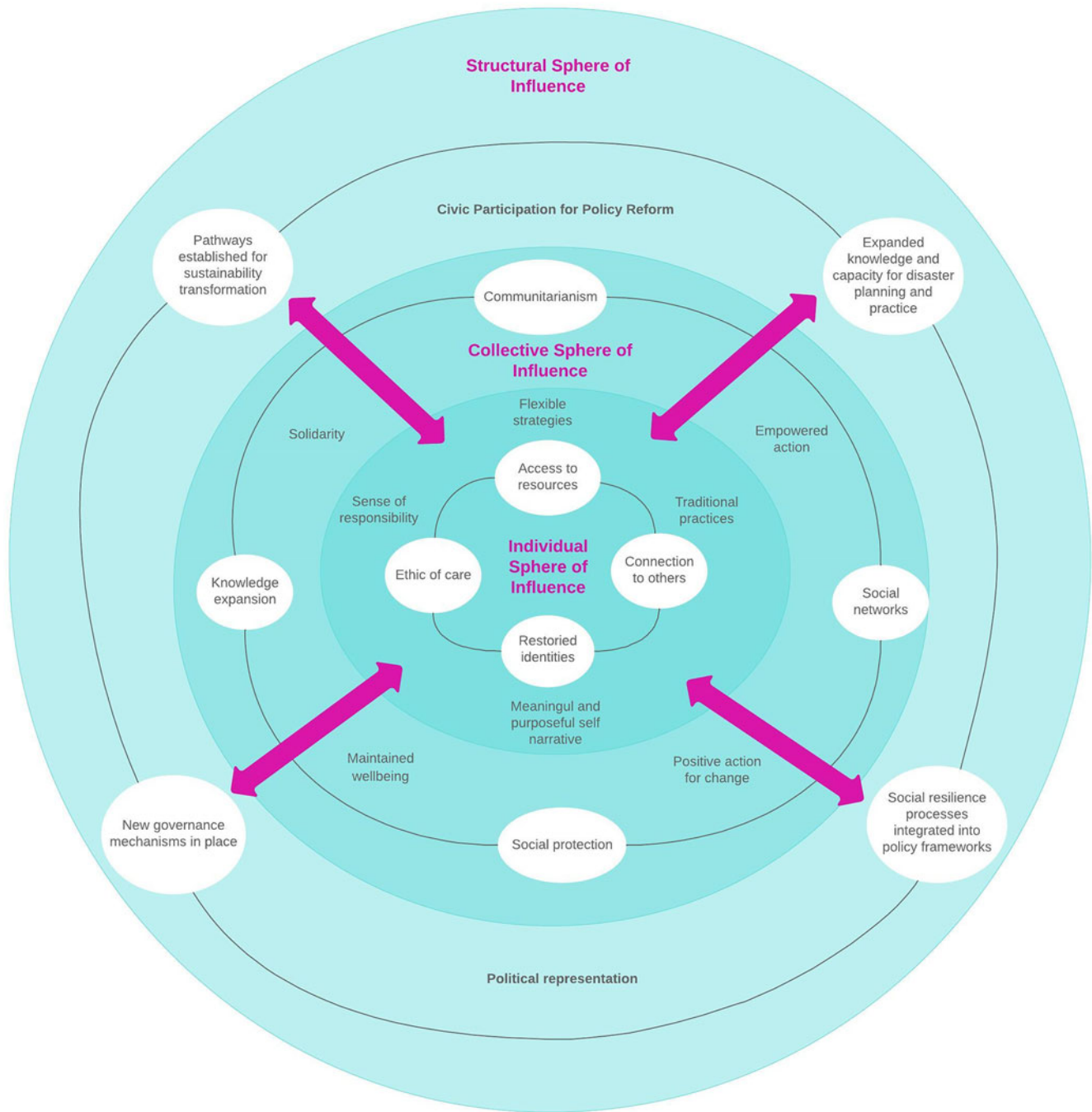


Figure 3. A relational sphere of influence framework for disaster resilience with transformative pathways for sustainability. Source: Author 1 adapted from Naito et al. (2022).

normative structures (Henry, 2012). In this way, they offer a transformative pathway for sustainability.

6.4 A relational sphere of influence framework

The Relational Sphere of Influence Framework we present (Figure 3) depicts a generic interpretation of dynamic social processes, synthesized reflexively from the literature sample, taking place within individual, collective, and structural spheres of influence. Social practices are depicted by the white circles and these are shaped and expanded by relational competencies, described

in text within each sphere. The arrows denote the expanding capacity generated through relational agency that can create transformative change. These spheres are in constant flux, and in real time, would overlap. The Framework can be adapted to specific social, cultural, institutional, or geographical contexts and then applied as a strategic tool to harness identified forms of relational agency in order to expand capacity for resilience outcomes. Applied in this way the Framework can also be used to quantify and qualify social resilience dynamics for integration into local planning processes (Chirisa, 2021; Henly-Shepard et al., 2015). The social and relational dynamics identified in this analysis

remind us that ‘environments can be designed so that we can draw easily on the intelligence located within tools and artifacts’ (Edwards, 2005, p. 173). When positive relations are built they act as a resource by expanding capacity for social practices of resilience (Choudhury et al., 2024) that can also be harnessed as pathways for broader sustainability transformation. This style of small-scale transformative change that occurs through expansive increments in competence, meaning and materiality is akin to the ‘butterfly’ metaphor adopted by atmospheric physicists to describe the sensitive interdependence of dynamic weather systems; whereby even the smallest change in conditions (e.g. the flapping of a butterfly’s wings) can lead to dramatic changes in the behavior of the system (Hilborn, 2004).

7. Conclusion

Processes of sustainability transformations arise from social practices, shared interpretations of the world, and the creation of relational agency that allows us to act on these interpretations (Edwards, 2005). Our review demonstrates that relational agency is indeed a powerful ‘resource’ (Edwards, 2005) and that the type of relations that take place can shape resilience outcomes. The Framework we present can be applied to capture these relational components to inform and design more effective policy and planning practices, which tend to prioritize local participation over fostering positive relationships from the outset. The Framework could also identify where certain negotiations need to take place in order to achieve better alignment of goals and objectives. We should point out however that the whilst the analysis offers deeper insights into these social processes, a key limitation is the scant empirical grounding of how socio-political factors can influence and distribute power within and across individual and collective spheres. Future research should, therefore, seek to explore evidence of these influences of broader socio-political concepts such as citizenship, national and local identities and democracy, and how this influences the quality of local partnerships, with a view to identifying how to secure long-term transformative social change for sustainability.

Relational agency offers an enhanced version of personal agency and, as a capacity, it can be learnt. Transformation occurs when we allow for diverse understandings to come together to work toward transforming a common object of focus in order to shift from an individualized or institutionalized short-term goal mindset to a collective long-term focused mindset (Engestrom, 2000). This collective shift can also foster a broader *social consciousness* (Daniels, 2016) to enable a transition toward shared goals for the common good. Transformation can also occur when relational agency expands our knowledge in a way that allows us to question existing or standard practices and progress toward testing new models of social practice (Engestrom, 2000).

An analysis by Henry (2012, p. 413) noted that: ‘there is much transformative potential in partnerships, and that theorizing on broad national and international trajectories of transformation needs to be tested through the study of locally negotiated practice.’ Our findings show that positive relationships, meaningful and purposeful identities, the ability to access local livelihood resources, and working toward a (re)storied and shared vision for the future can lead to expansive and incremental transformative resilience outcomes. It is important, therefore, to unlock relational agency (as an enabling factor) to promote constructive partnerships to ensure that the scale of influence goes beyond a localized collective level, which is not enough to create long-term

systemic level transformation (Bousquet et al., 2016). Finally, our analysis shows that when we explore the intricate social organization of disaster recovery processes across all levels of the social system, we can uncover more effective ways of working to harness relationality as a resource that serves to expand our capacity for longer-term transformative sustainability outcomes. We liken this incremental and expansive style of transformation to the *butterfly effect*.

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