

The Processual Character of Vulnerability: Overcoming Conceptual Barriers Hindering Knowledge for a Just Twin Transition

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Abstract

This article critically explores vulnerability as a key concept for analysing structural inequality. Drawing on 402 narrative interviews across 30 European NUTS2 regions, it examines how governance barriers hinder a just transition. The interviews capture diverse positions in terms of age, class, gender, occupation, place of residence, migration patterns, etc., asking how green and digital transitions affect everyday life. Empirically, the article advances two core arguments: First, vulnerability is not a stable identifier but a contingent, relational, and processual condition that emerges across situations and temporal trajectories. Second, the twin green and digital transition reshapes vulnerability in unpredictable ways, as policies and transition processes transform socio-economic and socio-technical relations, generating new forms of agency and vulnerability. The findings show that processual vulnerability involves accommodation, resistance, negotiation, and everyday reconfiguration, offering insights into how vulnerability can be approached not as a stable identifier or statistical category, but as a process. The results are relevant for qualitative and quantitative studies of the twin transition.

Keywords

digital transition; Europe; governance; green transition; intersectionality; landscapes; processual vulnerability; socio-technical systems; twin transition

1. Introduction

Academic discourse and EU policy frequently invoke vulnerability by emphasising vulnerable groups (e.g., European Commission, 2022, p. 24, 2024; Leinonen & Tuominen, 2025; MacNamara et al., 2025). The dominant assumption is that the twin transition—the green and the digital—is hindered because the most vulnerable groups lag behind or are disproportionately affected by transition policies and their indirect effects. Vulnerability thus tends to be treated as a pre-existing condition attached to specific populations that must be identified, governed, and subsequently protected or compensated through policy.

However, this framing rests on an implicit directionality: Vulnerability is assumed to exist prior to policy intervention and to reside in group characteristics (cf. Fineman, 2008). As a result, it is conceptualised as a condition that some people or groups intrinsically have, rather than as something produced, intensified, or transformed through institutional arrangements, policy design, and socio-technical change. This use of the concept risks obscuring how transition policies themselves—through regulatory complexity, digitalisation, market mechanisms, and governance structures—actively shape who becomes vulnerable, when, and under what conditions.

At the same time, the twin transition is increasingly recognised as more than the addition of a digital layer to a green agenda. Rather, it is understood as the co-evolution of digitalisation and decarbonisation, producing synergies and tensions across energy systems, labour markets, welfare arrangements, and everyday practices. Understanding vulnerability in this context requires attention to how green and digital transformations reconfigure social relations, redistribute responsibilities, and reshape capacities for participation. Although relational vulnerability is not theoretically new, it remains underexplored in relation to the twin transition. Little empirical research investigates how vulnerability unfolds through everyday interactions with policies, institutions, infrastructures, or landscapes (cf. Juhl et al., 2025; Kehler & Birchall, 2021; Kortetmäki & Järvelä, 2021), especially through qualitative data. This article draws on a unique qualitative dataset of 402 narrative interviews conducted in nine European countries across 30 NUTS2 regions. Rather than using participants' characteristics to predefine vulnerable groups, the interviews examine how vulnerabilities emerge, shift, and accumulate in relation to green and digital transitions. The central analytical challenge is therefore how to approach vulnerability not as a stable identifier—something people are—but as a process: something made, undone, and remade over time and across situations.

This article aims to develop a process-oriented understanding of vulnerability as it emerges in the interview narratives, with the purpose of overcoming conceptual barriers that limit knowledge production in the twin transition as a policy domain. We argue that prevailing conceptualisations of vulnerability in EU policy and some academic research constrain the pursuit of a just twin transition by framing vulnerability as static, group-based, and primarily outcome-oriented. Such policy approaches seek success in achieving transition while addressing vulnerability, rather than recognising vulnerability as a dynamic and inherent feature of society that structures and motivates transition. The analysis advances two core arguments:

1. Vulnerability is not a stable identifier but a contingent, relational, and processual condition that emerges in specific situations and temporal trajectories rather than as a fixed group attribute.
2. The twin green and digital transition reshapes vulnerability in unpredictable ways, as transition processes and policies themselves transform socio-economic and socio-technical relations and can generate new forms of vulnerability.

The following section reviews approaches to vulnerability and provides the analytical basis for examining how prevailing conceptualisations of vulnerability may function as barriers to a just twin transition. The article then presents the methods and materials, identifies processes of vulnerability in the data, and concludes with a discussion of the findings and their implications.

2. Different Conceptualisations of Vulnerability

The question of how vulnerability is conceptualised in policy is not neutral: It shapes problem definitions, allocates responsibility, and delimits the scope of justice claims (cf. Gilodi et al., 2024). This section presents an overview of different conceptualisations and their consequences for policy work and research.

In both research and EU policy on the twin transition, vulnerability is often framed as existing prior to policy intervention rather than something that policy design may produce. It is conceptualised through an emphasis on identifying and protecting vulnerable groups, the most vulnerable, or those at risk (e.g., European Commission, 2022, p. 24, 2024; Leinonen & Tuominen, 2025; MacNamara et al., 2025). Such categorisation reflects a frequentist logic that treats vulnerability as a *fixed attribute* distributed across populations rather than as a dynamic outcome of institutional arrangements (cf. O'Higgins & Brockie, 2024).

Fineman's (2008, 2010) vulnerability theory challenges the treatment of vulnerability as an attribute of predefined "vulnerable groups" and static vulnerability profiles by arguing that vulnerability is a universal and constant feature of the human condition, while resilience is unevenly distributed through social and institutional arrangements (cf. Butler, 2016; Cole, 2016). This issue of resilience is also addressed in other dominant frameworks, particularly in sustainability and climate science, where vulnerability is conceptualised as a function of exposure, sensitivity, and adaptive capacity, often operationalised to identify populations or regions "at risk" from environmental or economic shocks (Estoque et al., 2023; Füssel, 2007; Pereira et al., 2024; cf. Juhl et al., 2025).

In this field of research, two contrasting conceptualisations of vulnerability are commonly applied: (a) end-point vulnerability, understood as residual harm after adaptation, and (b) contextual vulnerability, defined as the social, political, and economic conditions that shape the ability to cope with or benefit from change (Füssel, 2007; Kelly & Adger, 2000). End-point framings often align with technocratic approaches that seek to identify who has been harmed and why, whereas contextual framings direct attention to the processes and conditions through which vulnerability emerges over time, foregrounding governance, power, and responsibility (O'Brien et al., 2007).

Within the contextual framing, vulnerability is increasingly seen as a marker of justice deficits, potentially also within socio-technical systems. For instance, the just transition and energy justice literatures provide a normative framework for linking vulnerability to justice outcomes in socio-technical systems (Jenkins et al., 2018; McCauley & Heffron, 2018). However, these approaches also tend to treat vulnerability as a condition that can be identified in advance and addressed through targeted interventions. Scholars therefore warn that—if vulnerability is treated as a static group trait—the justice language risks being reduced to compensatory policy measures that depoliticise structural inequality (Jenkins et al., 2021).

Arguing against the notion of vulnerability as a fixed attribute, critical vulnerability scholars have reframed vulnerability as relational and dynamic, as well as actively produced, intensified, or mitigated by governance arrangements, welfare regimes, market structures, and regulatory choices (Fineman, 2008; O'Brien et al., 2007). For instance, post-disaster policies may themselves produce unsafe conditions, a phenomenon described as the production of disaster vulnerability (Sandoval & Voss, 2016). Policy literature has likewise shifted from static conceptualisations of vulnerability towards a “more universal thinking about vulnerability,” recognising how vulnerability shifts between situations (Helberger et al., 2022, p. 180).

In line with this relational, dynamic, and institutionally produced notion of vulnerability, bioethics literature (Have, 2016; Mergen & Akpınar, 2021; Rogers, 2014; Rogers et al., 2012) applies the concept of layered vulnerability, emphasising its dynamic, situational, and cumulative character (cf. Luna, 2009). This perspective suggests that individuals or groups are rendered vulnerable by specific contextual conditions. What matters analytically is not whether a group is vulnerable *per se*, but how legal, economic, social, and technological arrangements add or remove layers of vulnerability. The layered approach aligns with intersectionality (e.g., Collins & Bilge, 2016) by emphasising that vulnerability is not monolithic; multiple layers related to socioeconomic conditions, age, gender, consent capacity, or social inequalities may coexist and interact (cf. Gilodi et al., 2024).

The twin transition adds complexity by embedding decarbonisation within digitally mediated infrastructures and governance mechanisms. In the EU context, research on just transition governance highlights the role of welfare systems, labour-market institutions, and territorial policy in shaping vulnerability during transitions (Sabato & Mandelli, 2024). The green and digital transformations can exacerbate, redistribute, or generate new risks and vulnerabilities in non-linear and often unpredictable ways (Andrea et al., 2025; Ascani et al., 2025; Svenberg et al., 2026). Critical scholarship highlights socio-material aspects of digitalisation and warns that digital solutions often shift responsibility onto individuals, require new forms of competence, and introduce opacity through data-driven decision-making (Horn & Felt, 2026). Furthermore, empirical studies show that digitalisation can exacerbate existing inequalities by privileging those with greater digital access, literacy, and flexibility while imposing new burdens on others (Kent et al., 2023).

Who is positioned as vulnerable in the twin transition is thus not only affected by institutional and relational power dynamics, but also by socio-material and processual changes. Vulnerabilities are mediated and delegated through technologies, infrastructures, tools, and consumer goods (cf. Callon & Rabeharisoa, 2008; Latour, 1990). Hägerstrand (2009) addressed changes to the processual landscape, a notion that encompasses not only an external dimension but also the circulation of landscape through human and non-human bodies. Hägerstrand's concept is useful for bringing the twin transition closer to the convergence between lived experience and the material consequences of green and digital technologies.

In conclusion, vulnerability theory increasingly challenges both the notion of vulnerability as a fixed attribute and the assumption that social, environmental, and technical domains can be treated separately. This has methodological implications: Instead of starting from predefined vulnerable groups, vulnerability can be approached through the experiences of individuals positioned—by policy, research, or social discourse—as “vulnerable.” We therefore use the empirical analysis to develop a processual understanding of vulnerability, rather than starting with a clear definition of vulnerability.

3. Methods and Material

This study draws on 402 narrative interviews exploring individuals' experiences of the green, digital, and twin transitions. Interviews were conducted in spring–summer 2025 across 30 European NUTS2 regions in Belgium, France, Greece, Ireland, Italy, Norway, Portugal, Spain, and Sweden (Supplementary File 1). The sample included rural and urban areas, industrially and agriculturally intensive regions, and the northernmost and southernmost parts of Europe, representing different stages of progression in the twin transition and different profiles of resource extraction (cf. Svenberg et al., 2026). The study combined convenience and purposive sampling to recruit participants. Targeted recruitment focused on individuals who either (a) live or work in situations shaped by specific aspects or dynamics of the twin transition, or (b) occupy a position of potential vulnerability, including gender, age, disability, immigrant or national minority status, religious minority status, sexual minority status, skill level, and urban–rural location (cf. Given, 2008). Inclusion criteria were age 18 or older and capacity to provide informed consent.

The narrative interview methodology was chosen to operationalise research questions concerning how individuals understand, experience, and negotiate the green and digital transitions in everyday life. A narrative approach minimises researcher priming and enables participants to articulate experiences and perspectives in their own terms (Kim, 2016). Narrative interviews do not follow a fixed question–answer format; instead, interviewees are treated as narrators. Rather than measuring predefined attitudes or behaviours, the study aimed to capture how participants connected the twin, green, and digital transitions to issues such as work, mobility, housing, family life, exclusion, participation, and future expectations. Narrative interviews were considered particularly suitable because they allow participants to define what aspects of societal change are meaningful in their own lives, while also enabling researchers to capture contextual and intersectional dimensions of inequality that may not emerge through more structured interview formats.

Most narrators were not familiar with the concept of the twin transition—only a few said they had reflected on it. In most cases, such reflections followed researchers' explanation of the term. Given the purposive yet broad sampling, the twin transition appears not to be a commonly known concept or phenomenon. Respondents were nonetheless eligible as narrators because their situations or profile enabled us to recognise the twin, green, and digital transitions in their narratives. Conceptual knowledge of the twin transition, and/or of green and digital transitions respectively, is not the same as relevant practical experience, and the latter is what we asked for.

Participants were approached directly and through organisations such as NGOs, advocacy groups, unions, businesses, educational institutions, religious organisations, public authorities, social media platforms, and public events. To avoid over-reliance on spokespersons, research teams prioritised direct engagement with individuals. Throughout the fieldwork, researchers recorded and monitored the sample composition in a shared participant overview document. Recruitment efforts were subsequently redirected toward underrepresented groups, regions, and profiles. Despite these efforts, some accessibility limitations remained. Individuals with significant language barriers, limited trust in research institutions, reduced communicative capacity, or severe time constraints were more difficult to recruit for narrative interviews. Yet the overall sampling logic aimed to secure a broad range of experiences related to social inequalities and the green and digital transitions.

Interviews were conducted online, by telephone, or in person and lasted between 30 and 120 minutes. Allowing multiple formats was important for inclusion, particularly when engaging participants in rural regions or individuals with mobility, health, or time-related constraints. The interview format was determined by the interviewees' preferences and needs. Researchers acknowledged that format could influence interactional dynamics, levels of detail, and participant comfort. However, the structure of the probes and the use of a standardised narrative report summarising key themes, vulnerabilities, enablers, hindrances, and illustrative quotations helped mitigate inconsistencies across formats.

Each interview followed four phases. First, participants received study information and provided informed consent. Second, the interview opened with a general background prompt designed to encourage free narration and situate the participant's social context (e.g., living conditions, family, employment), followed by an open-ended question introducing the main topic. Interviewers mainly adopted a listening role and used probing questions either to encourage elaboration ("Can you tell me more about that?") or to help participants maintain focus on the topic. Third, a clarification phase addressed events, actors, causes, and consequences raised during the interview. Finally, participants were invited to add further comments, their rights were reiterated, and the interview concluded.

All interviews were audio-recorded and transcribed as necessary. After each interview, the researcher produced a report including recruitment context, relevant dimensions of inequality or vulnerability, illustrative quotations, and analysis of barriers and enablers related to the green and digital transitions. The full reports also included narrative retelling (approximately 500–750 words). Following data collection, all reports underwent quality control to ensure consistency in terminology, categorisation, and completeness. The code following each quotation or retelling in the Result section (e.g., EFIS037) indicates the project partner that conducted the interview followed by the numerical order in which it was reported.

The analysis proceeded in stages. First, overarching categories related to vulnerability and agency were identified. Second, themes central to the twin transition–vulnerability nexus were generated. Third, situational specificities within narratives were examined. The themes and analysis presented below are drawn from a systematic analysis of the full dataset (see Svenberg et al., 2026), with selected narratives used as illustrative examples. Close reading of all narrative reports produced concise summaries of vulnerability-related themes, enabling narratives to be grouped by vulnerability profiles and twin transition themes. Initial coding was highly abstract because many narratives were categorised, before codes were concretised within themes such as mobility or unemployment. A shared set of methodological guidelines, an interview guide, and a narrative reporting template were developed, drawing on prior research on vulnerabilities, inequalities, and social change. Participant materials included an information sheet, consent form, and demographic questionnaire, adapted to national contexts and translated as necessary. Because data collection was extensive and involved 18 interviewers, efforts were made to ensure consistency, quality, and validation of both procedures and results. Workshops were carried out at all stages of the process, including prior to, during, and after fieldwork. This included comparing interview transcripts following discussions of interviewing methods and a review of the consistency between narrative reports and full interviews, using a sample of interviews from each partner. Additional meetings and weekly helpdesk sessions were organised during fieldwork to discuss recruitment challenges, interviewing practices, and reporting issues, ensuring methodological and analytical consistency.

4. Results

This section presents the results in seven thematic domains, based on how vulnerability in the twin transition emerges through twin transition synergy, twin pressure, digital mediation, mobility and access, work and economy, identity and belonging, and rurality and landscape. These domains are related to enablers and barriers, as well as opportunities and pressures (Figure 1). As a consequence of cross-cutting and intersectional conditions such as temporal pressure and economic inequality, the section is structured around four central aspects of processual vulnerability: (a) accommodation, (b) resistance, (c) negotiation, and (d) everyday reconfiguration—understood as a dynamic relationship between vulnerability and agency.

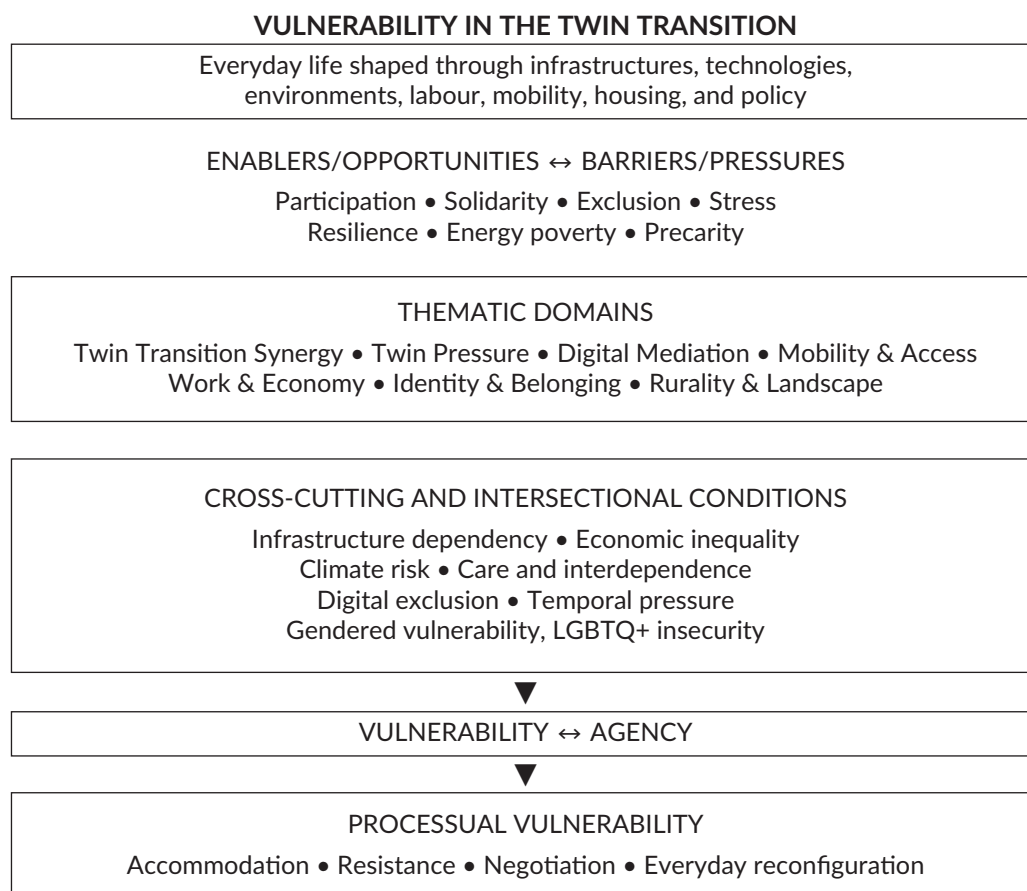


Figure 1. Processual vulnerability. Notes: The first box identifies how the twin transition intervenes through policy and socio-technical systems, placing everyday life under pressure and redistributing resources; the synchronic modification of green and digital aspects in this box is what makes production of vulnerabilities in the twin transition distinct. The enablers and barriers link to agency to push back on pressure, including resilience, solidarity, and participation. Thematic domains, exemplified below, illustrate processes identified across all 402 narratives (Supplementary File 1), and themes generated from bottom-up coding (Supplementary File 2). Cross-cutting conditions designate inequality grounds and oppressing features, and societal conflicts that cut across all thematic domains and generate vulnerability. The final box presents the processual character of vulnerability through accommodation, resistance, negotiation, and everyday reconfiguration.

4.1. Twin Transition Synergy

Examples of synergies sometimes appeared because narrators raised them, but more often they emerged when narrators described practices that, in effect, linked the green and digital transitions.

These examples show that the twin transition can be an unreflected practice: Rather than being explicitly articulated, it may emerge through everyday reconfigurations. Rachel, for example, is a young person living in Galway, Ireland. Having grown up with an awareness of waste, she has integrated the use of apps for rescuing surplus food from restaurants and for buying second-hand clothes (EFIS025). Annika, who works as a clerk in a Swedish office, began working from home three days a week after the pandemic, thereby reducing resources spent on commuting. Her description also makes clear that what was new in online meetings was not primarily the technology itself, but a shift in norms and knowledge that made remote working possible (UGOT07). In both examples, the synergy between the green and digital transitions emerges from below. While these practices facilitate everyday life, they also show that the twin transition is enacted through practice rather than articulation.

4.2. Twin Pressure

However, twin transition narratives also reveal another side, where green and digital policies and infrastructure create pressures in the form of marginalisation, deprivation, or stress. Abdoul, who lives in Lisboa, feels that infrastructure and digital services in his neighbourhood lag behind. Contrary to the region's image and official policy promises, he feels he lives in neither a smart nor a green city. He notes that buses are unreliable and that wealthy neighbourhoods are thriving, while his part of town is losing local bank offices as services move online, despite frequent failures in household internet connections (AUTH16). Yet there is also a strong element of negotiation in these reflections, as Abdoul imagines another form of digitalisation that could strengthen local resilience if certain services such as better internet connection were in place.

Another narrative comes from Flora, an Albanian woman living in Athens, who previously struggled to pay bills using her phone but now manages without difficulty. What she still needs help with, however, is paying her electricity bills, for which her daughter provides financial support. This illustrates that digital literacy alone cannot overcome financial constraints or address issues of affordability. Because she rents her apartment, she cannot invest in greener and cheaper energy solutions, such as installing a heat pump (AUTH93). Here, vulnerability lies in the relational character of the tenant–landlord relationship—a structural condition and power relation that green energy policies should address not by helping “the vulnerable,” but by responsabilising landlords.

Accommodation, the word we use for specific processual vulnerability, does not mean defeat. Rather, it is a process initiated by green and digital policies, technologies, and infrastructures that create difficulties people must manage and negotiate. At the same time, reflections on these limitations, and the strategies developed to manage them, illustrate forms of agency emerging from lived experience of vulnerability.

4.3. Digital Mediation

The digital and green transitions intervene in the tempo of people's lives, and digital fatigue or burnout may emerge from stress and accelerated rhythms. Experiences of vulnerability can provoke action; in relation to burnout, this may occur through withdrawal, where abstaining from certain activities becomes as important as participation. Linda, a mother in Stockholm, experienced turning points that required recovery after childbirth and burnout. She eventually reprioritised her life in relation to the highly profit-driven work she had previously done, seeing ecological destruction as harming both other species and herself through constant overwork (UGOT10). Camille, a trans man in Paris, initially felt belonging through social media but later felt trapped within big-tech infrastructures (EFIS62). Breaking free from these platforms reflected the tension between convenience and autonomy.

In these examples, agency, accommodation, and even resistance begin with slowing down and reversing the direction of speed. This may involve abstaining from certain forms of digital infrastructure. Bella, a woman who moved to Athens from another country, lives what she describes as a slow digital life. Although she does not report having experienced burnout, she consciously avoids many digital tools and cannot understand how "having a break" could be associated with staring at a phone. Her digital slowness is combined with low-level consumption, meaning that she avoids both excessive screen exposure and unnecessary purchasing (AUTH102).

Other narrators report frustration with the increasing digitalisation of everyday activities and the growth of digital "household" duties. Nora, in Italy, describes being required to perform such tasks, for example, reporting tax, managing bank transfers, or booking medical appointments, previously carried out by salaried professionals (EFIS33). Digital tools both facilitate and complicate daily life, the latter carrying the risk of digital stress and overexposure when all aspects of life become saturated by online communication, log-in systems, social media expectations, or forms of micro-reporting. The response to such conditions cannot be more of the same but must instead involve slowing down the use of digital tools. Resistance therefore has an important role in such processes.

4.4. Mobility & Access

Issues of mobility and immobility are deeply intertwined with vulnerability through people's constant dependence on infrastructure, whether in the form of car dependency, bicycle lanes, or public transport. Paola, who lives in a larger city in Italy and depends on the metro in her daily routine, experiences that public transport has become cleaner and more frequent (EFIS112). With the twin transition, the distribution and allocation of resources between different modes of transport may change. Just as some people depend on public transport, all forms of mobility create relational bonds with infrastructure, whether for car drivers, pedestrians, or cyclists. Many narrators, however, testify that their low-emission modes of transport are not especially supported.

Bengt-Arne, a middle-aged narrator in Sweden, commutes by bicycle on a country road where heavy traffic speeds past him (UGOT25). His sense of vulnerability in that situation runs somewhat counter to what might be expected, given that green policies ostensibly favour low-carbon travel. This also illustrates how cycling in rural or sparsely populated areas can create vulnerable situations, and how personal efforts to reduce car

dependency, an everyday reconfiguration, are not necessarily met with supportive policies or infrastructure. Another aspect concerns access, or lack of access, to communication and online connectivity. Natalia, an unemployed single mother in rural Greece, is among the narrators who experience immobility because of non-existent public transport and fuel prices that make every car journey prohibitively expensive. In addition, she describes how the internet connection in her village is highly unstable, which may intensify the effects of having to minimise travel (AUTH63).

However, although such examples display relatively non-negotiable vulnerabilities, accommodation and everyday reconfiguration should not be understood as purely individual processes. Physical and digital infrastructures change over time, and while fewer travel options may cause isolation, digital communication can also compensate for mobility constraints. Margaret, a senior citizen from central Macedonia in Greece, is not very physically mobile because of her age and poor public transport, but values the digital transition because it helps her stay in touch with her children and grandchildren (AUTH94). Bjørg, a retired academic in inland Norway, uses online meeting tools to maintain research networks (UGOT138). These examples show how the digital transition can reshape potentially vulnerable positions related to mobility, as the twin transition involves a negotiation between physical travel and online presence. Everyday reconfigurations may therefore occur at infrastructural and collective levels, showing that processual vulnerability is relational rather than purely individual.

4.5. Work & Economy

In relation to work and industries, vulnerability is often attached to occupational groups or industries at risk of being replaced by automated digital solutions or by production methods and products that comply with specific sustainability standards. New production methods also require workers to re- or upskill, meaning that low-skilled groups are often portrayed as more vulnerable in the transitions. Although this notion of vulnerability appears in our material—for instance, through workers in creative industries discussing the threat posed by AI to their future employment opportunities—other narratives point to different forms of vulnerability.

Sara, who works as a veterinarian among farmers in Galicia, describes how she supports her clients in navigating complex digital platforms to prove that their traditional practices are “sustainable enough.” She reflects on how these farmers—despite caring for their animals and land and passing knowledge across generations—must now obtain certificates through digital systems that they cannot properly access because of power cuts and poor internet connections in the mountainous villages (AUTH38). Another example is provided by Ron, who lives in Spain and works with traditional basket weaving. Ron explains how traditional basketry requires a high degree of adaptation to the materials available each season and to the ways weather conditions affect those materials. This knowledge, he asserts, is what makes both the products and the craft genuinely sustainable. However, these practices are challenged by digital market demands for standardisation and expectations of uniform sizes, consistent colours, and year-round availability of materials and finished products (AUTH54).

Consequently, expectations linked to digitalisation and the green transition risk replacing traditional knowledge, practices, and production that are already sustainable and resilient. For these workers, negotiation concerns not only changes to production and marketing methods, but also what it means to

lower product standards—and the sustainability of the products—to compete with other producers. Rather than describing these workers as vulnerable because of their occupational belonging or individual skill sets, the administrative, technical, and infrastructural systems should be understood as producing vulnerability, and negotiation takes place in relation to these systems.

Another source of vulnerability relates to climate change, such as droughts and floods affecting farmers and businesses in especially exposed regions. For instance, Kane, a Greek farmer, describes how the floods in 2023 destroyed his entire harvest. He points to the regional authorities' lack of action in providing necessary flood protection, embankment repairs, and closed-loop irrigation networks available in other areas (AUTH75). In this case, vulnerability arises from the inadequate infrastructure and insufficient public action. Another example concerns the tourism industry, where business owners and employees could be categorised as vulnerable in relation to both climate change and tourism's environmental impact. Yet the narratives also provide several examples of everyday reconfiguration and a proactive refocusing within the industry. Jenny, who works in tourism in Sweden, describes how, after becoming aware of tourism's negative effects, she decided to organise local nature experiences and give lectures on sustainable tourism (UGOT20). Similarly, Louise, who runs a regional travel and events agency in Alsace, states that her company takes pride in keeping sustainability at the core of its activities, even though many clients show little interest in such efforts (EFIS093).

These examples illustrate how potentially vulnerable positions can be counteracted and reframed by individual agency. However, labour-market vulnerability can also be associated with groups especially exposed to unemployment, as well as with processes shaped by market competitiveness, economic volatility, precarious employment, and digital technologies and tools. Niklas, a Swedish cultural worker, narrates how he began delivering food as a gig worker during the Covid pandemic. As all cultural events were cancelled, this provided him with an income while enabling him to maintain several jobs simultaneously. He describes how—by taking calls while cycling and responding to emails while waiting for food deliveries—he managed 11 different jobs at the same time. Because this created an extremely stressful situation, he eventually developed health problems and had to withdraw from the jobs that provided the least income. Although gig work is generally associated with more vulnerable positions in the labour market, he found that working as a rider provided the highest salary (UGOT31).

The relationship between accommodation and everyday reconfiguration is therefore highly intricate. While accommodation can take multiple forms in relation to vulnerability, everyday reconfiguration only seemingly involves greater agency in everyday reconfiguration. The process described above is not a linear or one-directional transition, but rather a combination of cross-cutting and intersectional conditions that both amplify and ground the processual character of vulnerability.

4.6. Identity & Belonging: The Case of Religious Minorities

Vulnerability, as produced through cross-cutting and intersectional conditions alongside various barriers and enablers, means that different groups possess different resources within the twin transition as a process of redistribution. Religious minorities are diverse groups, further differentiated by class, ethnicity, and attitudes towards transition. Certain aspects, however, emerge as specific to religious identification and to dynamics of identity and belonging in relation to majority populations.

Social media, for example, was noted as a positive tool for community-building. Sara, who works within Muslim civil society, argues that as pressure on Muslim organisations increases and authorities complicate their work, social media becomes an important means of building community and engaging in discussion (UGOT22). Rebecca, a Jewish culture-worker living in a small city in northern Sweden, attends online religious studies and meets other Jews online, as there is no organised Jewish community where she lives (UGOT97).

While minorities may use digital tools advantageously, the same narratives also highlight vulnerabilities. Rebecca notes that digital communities can create an illusion of closeness, and the fragility of online relationships becomes apparent when conflicts arise, affecting both her religious community and distant relatives. Social media also exposes users to online hate. Hakim, an entrepreneur developing his business with AI and digital tools, recalls participating in hostile discussions in newspaper comment sections, which eventually became unbearable because of anti-Muslim sentiment, leading him to limit his online presence (UGOT32).

Others raise concerns about well-being and engage in negotiation regarding their own role in digital communication, both within and beyond their minority communities, and in relation to their faith. Per, a Muslim narrator, observes that “the eyes and ears are the pathways to the heart,” highlighting the difficulty of remaining emotionally unaffected by digital content (UGOT37). Ashar, a middle-aged father in a larger Swedish city, reflects on his children reaching the age of smartphone use, worrying that exposure to inappropriate content may conflict with Islamic values (UGOT37). Benjamin, a practising Jew, values the fact that his family avoids electronics during religious holidays, including every seventh day, a practice he considers distinctive (UGOT145).

These accounts of religious minorities highlight the complex relationship between opportunity and vulnerability in the context of the twin transition. From an intersectional perspective, identification with a religious minority is just one of several potential sources of vulnerability, as many aspects of individuals’ lives overlap with those of the wider population. This may be understood either as an additional layer of vulnerability or as a reflection of how individuals interpret and negotiate their experiences through a religious lens, particularly in relation to the minority group’s interactions with digital channels dominated by the secular majority.

4.7. *Rurality & Landscape*

Vulnerability has a relational character, involving not only the individual but also the surrounding environment—human and non-human elements that sustain and nurture local communities. Landscapes are processual (Hägerstrand, 2009), and the narratives illustrate how changing landscapes shape lived experiences. Everyday reconfiguration takes place within landscapes that are themselves undergoing socio-technical reconfiguration. Mike, who lives in rural Greece, participates in a governmental program for installing photovoltaic cells, thereby actively contributing to the modification of the rural landscape (AUTH76). Kane, a farmer in rural Greece, describes how digital tools have altered his experience of farming by increasing precision and improving the capacity to monitor crops, developments he perceives positively (AUTH75).

Resistance also plays an important role in relation to vulnerability as a process. Although resistance often involves strong forms of agency, it may itself generate vulnerable positions or situations. Louise, who lives in rural Sweden, describes how the processual landscape around her has been transformed by wind-power development, which she experiences as devastating because of noise and disturbance to the local environment (UGOT03). In her case, vulnerability is tied to rural living, but her opposition to wind farms also reflects ongoing policy-formation and permitting processes in which individual residents may feel, or be, completely overrun. Landscapes in northern Europe also embody longer colonial histories related to resource extraction, meaning that landscapes themselves carry additional intersectional vulnerabilities. Maarja, living in northernmost Norway, narrates the Sámi experience of intertwined colonialism and green industrialism, in which the changing landscape disrupts reindeer breeding grounds (UGOT105). Neither in her case nor in others does this discourage action and resistance; however, the situation demands exhausting forms of agency, illustrating struggles within landscapes that are shaped by intersecting political, economic, and environmental interests.

5. Discussion

What characterises the twin transition, and shapes its relation to vulnerability, is the extent to which green and digital policies, technologies, and infrastructures become entangled with everyday practices and engagement from below. Vulnerability is thus a consequence of the barriers and enablers introduced in daily life, directly or indirectly, through such policy or infrastructure. By introducing processual vulnerability, we argue that vulnerability in the twin transition is not a stable condition attached to predefined groups, but a relational process produced through interactions between policies, infrastructures, technologies, territorial conditions, and everyday practices. This requires moving beyond transition as the implementation of programmes or policies, and recognising it as ongoing practices and negotiations that co-produce green and digital change. Practical consequences are negotiated through accommodation, negotiation, resistance, and everyday reconfiguration. Processual vulnerability thereby stems from, and is operationalised through, the socio-technical dynamics that shape how vulnerability is experienced and managed as both context and consequence of the twin transition.

This article has set out to critique conceptual barriers that shape how vulnerability is understood, and to develop a process-oriented understanding of vulnerability. The critique is directed at how vulnerability is frequently invoked through references to “the most vulnerable” or “populations at risk” (e.g., European Commission, 2022, p. 24, 2024; Leinonen & Tuominen, 2025; MacNamara et al., 2025). In contrast, our analysis suggests that vulnerability is continuously produced and transformed in relation to institutional arrangements, socio-technical infrastructures, territorial conditions, and life-course trajectories. No groups are inherently vulnerable across all contexts and over time; rather, when people are placed in situations that invoke vulnerability, agency becomes part of the same process. Overcoming conceptual barriers therefore means not only refining definitions, but also modifying researchers’ and policymakers’ perspectives on the reconfiguring practices in which people are engaged. It also means recognising that negotiation and resistance are not obstacles to be overcome, but dynamics of vulnerability as a non-passive phenomenon. As Callon (2008) reminds us, narrators who become objects of critical analysis do carry critical capacities themselves.

Moreover, inequalities, vulnerabilities, and privileges are not solely social categorisations of bodies; they are mediated and delegated through technologies, infrastructures, tools, and consumer goods (cf. Callon &

Rabearisoa, 2008; Latour, 1990). Our empirical material supports the claim that vulnerability is a shared human propensity (cf. Cole, 2016; Fineman, 2008, 2010), while inequalities shape exposure to its consequences. The production of vulnerability operates through networks ranging from platform-based gig work to infrastructural transformations and modified landscapes. Across all empirical domains, infrastructural conditions emerged as a key mediating mechanism through which vulnerability was produced, negotiated, or mitigated. Unstable internet connections, inaccessible digital systems or modes of transport, emerging platform economies, and changing energy landscapes shaped both exposure to vulnerability and the possibilities for agency, adaptation, and resistance. The twin transition entails technical, environmental, infrastructural, and political reconfigurations occurring simultaneously (e.g., Horn & Felt, 2026; Jørgensen et al., 2026; Sabato & Mandelli, 2024), requiring governance of interwoven socio-political, technical, and material processes.

Within this complexity, vulnerability cannot be reduced to a linear means–ends relationship in policy design. It emerges through unpredictable and sometimes unintended consequences (cf. Andrea et al., 2025; Ascani et al., 2025; Svenberg et al., 2026). A process-oriented understanding of vulnerability implies that governance cannot rely solely on predefined vulnerable categories or static impact assessments. While this emphasis is not new within vulnerability scholarship (e.g., Amorim-Maia et al., 2022; Gilodi et al., 2024), our findings substantiate claims that vulnerability extends beyond static group characteristics or statistical risk factors. Both vulnerability and transition are moving targets: They evolve, intersect, and occasionally intensify when configurations converge or when policy interventions aimed at solving one problem generate new ones (cf. Steffek & Wegmann, 2021). Conceptualising vulnerability as processual captures its relational, situational, and temporal dimensions (cf. Fineman, 2008; Hägerstrand, 2009; O'Brien et al., 2007), helping close the gap between practical and conceptual levels in transition studies.

Yet, while interview participants rarely described themselves as vulnerable *per se*, they narrated situations in which they experienced vulnerability. Narrators themselves often lacked a fixed articulation or definition of vulnerability, but their practices and lived experience make the empirical material relevant for identifying processes. Because vulnerability is not fixed, vulnerable positions may also be reversible. As illustrated in the analysis, occupational burnout may, for example, be mitigated through altered work environments, social networks, tasks, or digital practices. Similarly, digital technologies may mitigate immobility through online communication, but if essential infrastructural conditions, most notably internet connection, are absent, the digitalisation of essential functions may reduce access. These aspects show that vulnerabilities do not merely occur; they are produced within socio-technical, political, and economic contexts (Füssel, 2007; Kelly & Adger, 2000).

From a governance perspective, vulnerability has a processual character because individuals remain active agents even under adverse conditions, and because transition continuously reshapes the circumstances under which people live. These findings underscore the importance of an intersectional perspective (cf. Collins & Bilge, 2016; Luna, 2009), in which vulnerability is understood as layered, relational, and context-dependent rather than as a fixed attribute. One example is the cyclist commuting along a heavily trafficked rural road without a designated bike lane. He participates in green transition practices—an example of everyday reconfiguration—but is insufficiently supported by policy frameworks designed to encourage low-carbon mobility. Contrary to assumptions that vulnerability primarily results from the implementation of green policies, our findings indicate that vulnerability may also arise when expectations

of transition are not supported by adequate policy or infrastructure. Vulnerability often emerged not from transition policies themselves, but from mismatches between policy ambitions and the infrastructural, territorial, and social conditions necessary to support them.

The validity of our claims rests on the breadth of vulnerability profiles explored and the representation of diverse demographic groups, although even such large material has selection biases and the analysis was difficult to harmonise across reports from different researchers. Because vulnerability informed the initial sampling strategy, certain ideas of vulnerability and intersectional inequality necessarily shaped the analysis; some groups may have been missed. Nevertheless, the study demonstrates that vulnerability does not consistently align with predefined categories. Groups commonly labelled “vulnerable” are not necessarily affected in anticipated ways, while others are affected for initially unidentified reasons. For example, members of religious minorities may be regarded as potentially vulnerable, yet they share many everyday conditions with the broader population. Vulnerability may be articulated in specific domains, such as parenting in digital environments, while religious identification adds a context-dependent layer. Our data suggest not only that agency persists within vulnerable situations, but also that vulnerability may motivate action. Transition cannot eliminate vulnerability as a dimension of the human condition, but it can alter the configurations within which vulnerability is experienced.

6. Conclusions

This article has argued that vulnerability in the twin transition is not a stable attribute attached to predefined groups, but a relational and processual condition produced through socio-technical infrastructures, institutional arrangements, territorial inequalities, and everyday practices. Focusing on vulnerability within the twin transition is warranted because green and digital transformations simultaneously mitigate and intensify existing inequalities, often in uneven and unpredictable ways. These dynamics emerge not only through intended policy outcomes, but also through the infrastructural, territorial, and network effects of transition processes themselves. Through the analysis of 402 narrative interviews conducted across multiple European contexts, this study has contributed empirical insights into how vulnerability is experienced, negotiated, and reconfigured in everyday life.

This study contributes a qualitative and process-oriented perspective to a field largely dominated by quantitative approaches, in which vulnerability is attributed to predefined groups or measured through statistical indicators. While such approaches are important for identifying patterns of inequality, they risk treating vulnerability as stable and countable rather than dynamic, relational, and context-dependent. Our findings demonstrate how vulnerability emerges through changing configurations of infrastructure, policy, technology, mobility, labour conditions, digital access, and environmental transformation. The literature indicates that vulnerability should be analysed not only as an object of policy concern but also as an effect of policy framing (Gilodi et al., 2024). When vulnerability is conceptualised as bounded to specific groups, static, and endpoint-oriented, policy responses tend to focus on mitigation and compensation while leaving underlying institutional arrangements intact (cf. Jenkins et al., 2021). The article contributes theoretically by showing how twin-transition governance produces new forms of vulnerability through infrastructural interdependence, and how agency and vulnerability coexist in everyday socio-technical practices. Processual vulnerability refers to accommodation, resistance, negotiation, and everyday reconfiguration at the meso-level, where agency and vulnerability constitute and reconstitute one another.

In the EU's twin transition, framings may constitute conceptual barriers to justice insofar as they limit policy's capacity to anticipate, prevent, and transform the institutional production of vulnerability. Alternative conceptualisations of vulnerability are therefore necessary for a just twin transition. As Gilodi et al. (2024, p. 629) observe, vulnerability is "socially, politically, geographically, and culturally situated," emphasising its embeddedness within broader structures. Group-based framings risk shifting attention toward compensating identified populations rather than redesigning the institutional, infrastructural, and digital arrangements needed to achieve the twin transition. Its effects are mediated through complex socio-technical systems and environmental transformations, including built infrastructure, commuting patterns, landscape modifications, cost structures, and technological affordances. Preventing vulnerability requires institutional accountability and universal accessibility, attention to power relations (e.g., housing tenure and legal status), assisted and non-digital access routes, and targeted infrastructural investments aligned with local conditions. The governance challenge is not simply to identify vulnerable groups, but to recognise how vulnerability is continuously produced, redistributed, and negotiated within the infrastructures and practices of transition itself.

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Conflict of Interests

The authors declare no conflict of interests.

Data Availability

The metadata for the narrative interviews conducted as part of the ST4TE project are publicly available in the Zenodo repository at (<https://doi.org/10.5281/zenodo.20610198>).

LLMs Disclosure

ChatGPT Edu has been used for prototyping Figure 1.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

References

- Amorim-Maia, A. T., Anguelovski, I., Chu, E., & Connolly, J. (2022). Intersectional climate justice: A conceptual pathway for bridging adaptation planning, transformative action, and social equity. *Urban Climate*, 41, Article 101053. <https://doi.org/10.1016/j.uclim.2021.101053>
- Andrea, A., Barbieri, N., Basilico, S., Dimarco, G., Marzucchi, A., & Rizzo, U. (2025). *The impact of twin transition on income inequality and employment quality*. Zenodo. <https://doi.org/10.5281/zenodo.17630637>
- Ascani, A., Barbieri, N., Basilico, S., Gilli, M., Marzucchi, A., Rizzo, U., & Sciavicco, G. (2025). *The geography of the green, digital and twin occupations in Europe: Mapping digital and green occupations and twin skill readiness in EU regions*. Zenodo. <https://doi.org/10.5281/zenodo.17466337>

- Butler, J. (2016). Rethinking vulnerability and resistance. In J. Butler, Z. Gambetti, & L. Sabsay (Eds.), *Vulnerability in resistance* (pp. 12–28). Duke University Press.
- Callon, M. (2008). Economic markets and the rise of interactive agencements: From prosthetic agencies to habilitated agencies. In T. Pinch & R. Swedberg (Eds.), *Living in a material world: Economic sociology meets science and technology studies* (pp. 29–56). MIT Press.
- Callon, M., & Rabeharisoa, V. (2008). The growing engagement of emergent concerned groups in political and economic life: Lessons from the French association of neuromuscular disease patients. *Science, Technology, & Human Values*, 33(2), 230–261. <https://doi.org/10.1177/0162243907311264>
- Cole, A. (2016). All of us are vulnerable, but some are more vulnerable than others: The political ambiguity of vulnerability studies, an ambivalent critique. *Critical Horizons*, 17(2), 260–277. <https://doi.org/10.1080/14409917.2016.1153896>
- Collins, P. H., & Bilge, S. (2016). *Intersectionality*. Polity.
- Estoque, R. C., Ishtiaque, A., Parajuli, J., Athukorala, D., Rabby, Y. W., & Ooba, M. (2023). Has the IPCC's revised vulnerability concept been well adopted? *Ambio*, 52(2), 376–389. <https://doi.org/10.1007/s13280-022-01806-z>
- European Commission. (2022). *2022 strategic foresight report: Twinning the green and digital transitions in the new geopolitical context*. Publications Office of the European Union. <https://op.europa.eu/en/publication-detail/-/publication/d04b2f02-f86b-11ec-b94a-01aa75ed71a1/language-en>
- European Commission. (2024). *Report on access to essential services in the EU: Commission staff working document*. Publications Office of the European Union. <https://data.europa.eu/doi/10.2767/447353>
- Fineman, M. A. (2010). The vulnerable subject: Anchoring equality in the human condition. In M. A. Fineman & A. Grear (Eds.), *Transcending the boundaries of law* (pp. 177–191). Routledge-Cavendish.
- Fineman, M. A. (2008). The vulnerable subject: Anchoring equality in the human condition. *Yale Journal of Law and Feminism*, 20(1), 1–23.
- Füssel, H.-M. (2007). Vulnerability: A generally applicable conceptual framework for climate change research. *Global Environmental Change*, 17(2), 155–167. <https://doi.org/10.1016/j.gloenvcha.2006.05.002>
- Gilodi, A., Albert, I., & Nienaber, B. (2024). Vulnerability in the context of migration: A critical overview and a new conceptual model. *Human Arenas*, 7(3), 620–640. <https://doi.org/10.1007/s42087-022-00288-5>
- Given, L. M. (Ed.). (2008). *The Sage encyclopedia of qualitative research methods*. Sage.
- Hägerstrand, T. (2009). *Tillvaroväven*. Forskningsrådet Formas.
- Have, H. T. (2016). *Vulnerability: Challenging bioethics*. Routledge.
- Helberger, N., Sax, M., Strycharz, J., & Micklitz, H. W. (2022). Choice architectures in the digital economy: Towards a new understanding of digital vulnerability. *Journal of Consumer Policy*, 45(2), 175–200. <https://doi.org/10.1007/s10603-021-09500-5>
- Horn, C., & Felt, U. (2026). On the environmental fragilities of digital solutionism: Articulating 'digital' and 'green' in the EU's 'twin transition.' *Journal of Environmental Policy & Planning*, 28(1), 39–57. <https://doi.org/10.1080/1523908X.2025.2515225>
- Jenkins, K., Sovacool, B. K., & McCauley, D. (2018). Humanizing sociotechnical transitions through energy justice: An ethical framework for global transformative change. *Energy Policy*, 117, 66–74. <https://doi.org/10.1016/j.enpol.2018.02.036>
- Jenkins, K., Sovacool, B. K., Mouter, N., Hacking, N., Burns, M.-K., & McCauley, D. (2021). The methodologies, geographies, and technologies of energy justice: A systematic and comprehensive review. *Environmental Research Letters*, 16(4), Article 043009. <https://doi.org/10.1088/1748-9326/abd78c>
- Juhl, M. S., Fertner, C., & Fryd, O. (2025). Social vulnerability in regional climate adaptation planning in

- Europe—Conceptions, operationalisations and shared challenges. *Environmental Science & Policy*, 171, Article 104161. <https://doi.org/10.1016/j.envsci.2025.104161>
- Jørgensen, P. S., Delannoy, L., Maniatakou, S., Folke, C., Moore, M.-L., & Olsson, P. (2026). Both adaptive and transformative capacities are necessary to navigate global polycrisis. *Global Sustainability*, 9, Article e16. <https://doi.org/10.1017/sus.2026.10053>
- Kehler, S., & Birchall, S. J. (2021). Social vulnerability and climate change adaptation: The critical importance of moving beyond technocratic policy approaches. *Environmental Science & Policy*, 124, 471–477. <https://doi.org/10.1016/j.envsci.2021.07.025>
- Kelly, P. M., & Adger, W. N. (2000). Theory and practice in assessing vulnerability to climate change and facilitating adaptation. *Climatic Change*, 47(4), 325–352. <https://doi.org/10.1023/A:1005627828199>
- Kent, A., Strid, S., Sandström, L., & Callerstig, A.-C. (2023). *RESISTIRE D4.4: Summary report on qualitative indicators*. Zenodo. <https://doi.org/10.5281/zenodo.8383361>
- Kim, J. (2016). *Understanding narrative inquiry: The crafting and analysis of stories as research*. Sage.
- Kortetmäki, T., & Järvelä, M. (2021). Social vulnerability to climate policies: Building a matrix to assess policy impacts on well-being. *Environmental Science & Policy*, 123, 220–228. <https://doi.org/10.1016/j.envsci.2021.05.018>
- Latour, B. (1990). Technology is society made durable. *The Sociological Review*, 38(1_suppl), 103–131. <https://doi.org/10.1111/j.1467-954X.1990.tb03350.x>
- Leinonen, A., & Tuominen, T. M. (2025). *Vulnerability assessment and engagement strategy* (Deliverable D1.4). READJUST. <https://cris.vtt.fi/en/publications/vulnerability-assessment-and-engagement-strategy>
- Luna, F. (2009). Elucidating the concept of vulnerability: Layers not labels. *International Journal of Feminist Approaches to Bioethics*, 2(1), 121–139. <https://doi.org/10.3138/ijfab.2.1.121>
- MacNamara, N., Bobek, A., & Clavero, S. (2025). *Embedding social justice in twin transition research: Concepts, definitions and methodological approach* (Deliverable D2.2). Zenodo. <https://doi.org/10.5281/zenodo.15801843>
- McCauley, D., & Heffron, R. (2018). Just transition: Integrating climate, energy and environmental justice. *Energy Policy*, 119, 1–7. <https://doi.org/10.1016/j.enpol.2018.04.014>
- Mergen, M., & Akpınar, A. (2021). Vulnerability: An integrative bioethics review and a proposed taxonomy. *Nursing Ethics*, 28(5), 750–765. <https://doi.org/10.1177/0969733020976180>
- O'Brien, K., Eriksen, S., Nygaard, L. P., & Schjolden, A. (2007). Why different interpretations of vulnerability matter in climate change discourses. *Climate Policy*, 7(1), 73–88. <https://doi.org/10.1080/14693062.2007.9685639>
- O'Higgins, N., & Brockie, K. (2024). The youth guarantee, vulnerability, and social exclusion among NEETs in Southern Europe. *Politics and Governance*, 12, Article 7469. <https://doi.org/10.17645/pag.7469>
- Pereira, J. G., Rosalino, L. M., Ekblom, A., & Santos, M. J. (2024). Livelihood vulnerability and human–wildlife interactions across protected areas. *Ecology & Society*, 29(1), Article 13. <https://doi.org/10.5751/ES-14605-290113>
- Rogers, W. (2014). Vulnerability and bioethics. In C. Mackenzie, W. Rogers, & S. Dodds (Eds.), *Vulnerability: New essays in ethics and feminist philosophy* (pp. 60–87). Oxford University Press.
- Rogers, W., Mackenzie, C., & Dodds, S. (2012). Why bioethics needs a concept of vulnerability. *International Journal of Feminist Approaches to Bioethics*, 5(2), 11–38. <https://doi.org/10.3138/ijfab.5.2.11>
- Sabato, S., & Mandelli, M. (2024). Towards an EU framework for a just transition: Welfare policies and politics for the socio-ecological transition. *European Political Science*, 23(1), 14–26. <https://doi.org/10.1057/s41304-023-00458-1>

- Sandoval, V., & Voss, M. (2016). Disaster governance and vulnerability: The case of Chile. *Politics and Governance*, 4(4). 107–116. <https://doi.org/10.17645/pag.v4i4.743>
- Steffek, J., & Wegmann, P. (2021). The standardization of “good governance” in the age of reflexive modernity. *Global Studies Quarterly*, 1(4), Article ksab029. <https://doi.org/10.1093/isagsq/ksab029>
- Svenberg, S., Davidsson, A., Strid, S., & Hultman, M. (2026). *Report on twin transition and intersectional inequalities: ST4TE Deliverable D2.5*. Zenodo. <https://doi.org/10.5281/zenodo.17979392>

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